United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
the University of Georgia,
College of Agricultural and
Environmental Sciences,
Agricultural Experiment
Stations

Soil Survey of Stewart County, Georgia

How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To fnd information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

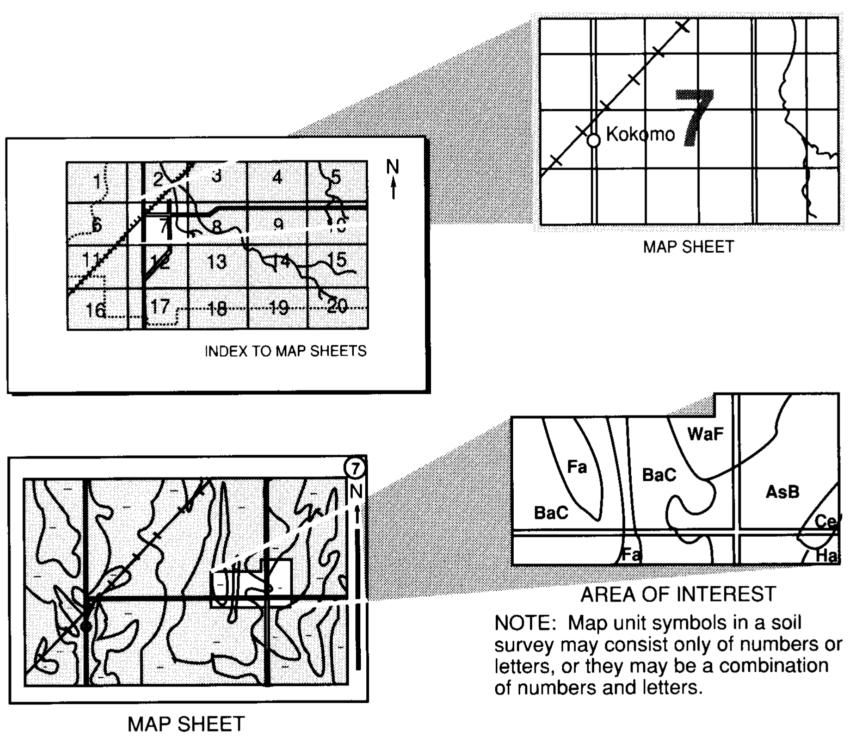
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To fnd information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specifc land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specifc needs.



National Cooperative Soil Survey

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. This survey was made cooperatively by the Natural Resources Conservation Service and the University of Georgia, College of Agricultural and Environmental Sciences, Agricultural Experiment Stations. The survey is part of the technical assistance furnished to the Lower Chattahoochee River Soil and Water Conservation District.

Major fieldwork for this soil survey was completed in 2008. Soil names and descriptions were approved in 2009. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2009. The most current official data are available on the Internet.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover Caption

An area of Gullied land-Nankin-Ailey complex, 15 to 90 percent slopes, severely eroded, in Providence Canyon State Park. The park is locally referred to as "Georgia's Little Grand Canyon."

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at http://www.nrcs.usda.gov.

Contents

Issued 2010

Foreword

Soil surveys contain information that affects land use planning in survey areas. They include predictions of soil behavior for selected land uses. The surveys highlight soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

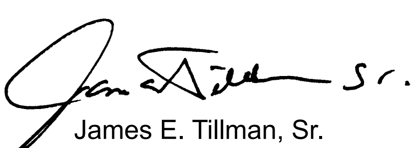
Soil surveys are designed for many different users. Farmers, ranchers, foresters, and agronomists can use the surveys to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the surveys to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the surveys to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each map unit is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.



James E. Tillman, Sr.
State Conservationist
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Soil Survey of
Stewart County, Georgia

By Kenneth W. Monroe

Fieldwork by Ken Monroe, Alfred Green, Jerry A. Pilkinton, and
Ernest H. Smith

United States Department of Agriculture, Natural Resources
Conservation Service,
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General Nature of the Survey Area

STEWART COUNTY is in southwestern Georgia, about 35 miles south of Columbus and 140 miles south-southwest of Atlanta (fig. 1). The total surface area of Stewart County is about 296,500 acres, including about 285,000 acres of private land, 4,500 acres of federal land, and 7,000 acres of water in areas of 40 acres or more. Stewart County is bounded on the north by Chattahoochee County, on the east by Webster County, on the south by Randolph and Quitman Counties, and on the west by the Chattahoochee River and the State of Alabama.

Elevation in the survey area ranges from about 190 feet along the Chattahoochee River to 680 feet north of the city of Lumpkin.

Stewart County is within parts of two Major Land Resource Areas: the Southern Coastal Plain (133A) and the Carolina and Georgia Sand Hills (137).

Surface relief in the Southern Coastal Plain ranges from nearly level to steep. Slopes range from 0 to 5 percent in the more nearly level areas and from 15 to 45 percent in the hilly and steeper areas. Good surface drainage prevails, except for in the lower-lying depressions and the areas along streams.

Most of the soils in the Southern Coastal Plain are on uplands, are well drained, have a sandy or loamy surface layer, and have a loamy or clayey subsoil. Some soils on the uplands are nearly level and are less well drained. They have a sandy surface layer and a loamy subsoil or have a loamy surface layer and clayey subsoil. Nearly level, poorly drained soils are on flood plains near steams or in depressions. The soils on flood plains are loamy or clayey throughout.

The extreme northeastern part of Stewart County is in the Carolina and Georgia Sand Hills. Surface relief ranges from nearly level to moderately steep. Slopes range from 0 to 8 percent in the more nearly level areas and from 10 to 25 percent in the steeper areas.

Most of the soils of the Carolina and Georgia Sand Hills are on uplands and are well drained or excessively drained. They have a sandy surface layer and a loamy subsoil or are sandy to a depth of 60 inches or more.

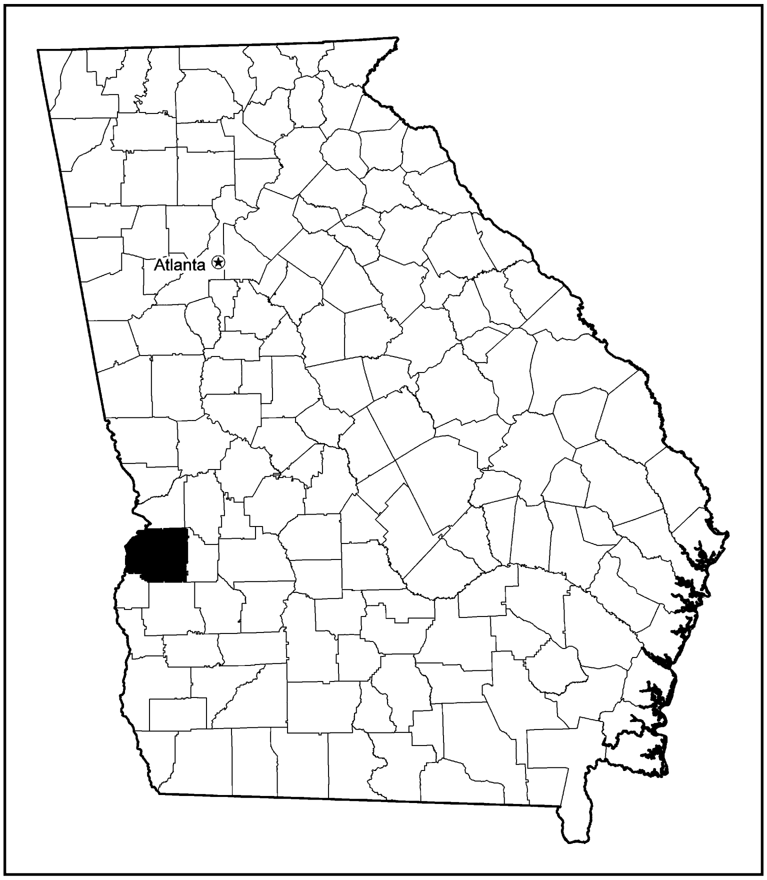

Figure 1.—Location of Stewart County in Georgia.

The county seat for Stewart County is the city of Lumkpin. Farming and associated agriculture-related enterprises are the chief industries. Over 82 percent of the county, or 240,664 acres, is forestland. About 235,000 acres, or 98 percent, of the forestland is privately owned. The remainder is owned by the state government. About 6 percent of the county, or 16,240 acres, is cropland or pastureland. The average farm size is about 145 acres. There is a trend in the county to convert agriculture land to residential or industrial use. About 2 percent of the land supports urban uses.

Climate

Prepared by the Natural Resources Conservation Service National Water and Climate Center, Portland, Oregon.

The climate tables were created using data from a climate station at Lumpkin, Georgia. Thunderstorm days, relative humidity, percent sunshine, and wind information were estimated from the first order station at Columbus, Georgia.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Lumpkin, Georgia, in the period 1970 to 2000. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 49.2 degrees F and the average daily minimum temperature is 36.5 degrees. The lowest temperature on record, which occurred on January 21, 1985, is -4 degrees. In summer, the average temperature is 78.4 degrees and the average daily maximum temperature is 90.6 degrees. The highest recorded temperature, which occurred on August 20, 1980, is 105 degrees.

Growing degree days are shown in the table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The average total annual precipitation is about 48.00 inches. Of this, 25.27 inches, or 53 percent, usually falls in April through October. The growing season for most crops is within this period. The heaviest 1-day rainfall during the period of record was 7.23 inches on December 6, 1972. Thunderstorms occur on about 54 days each year, and most occur in July.

The average seasonal snowfall is about 0.0 inches. The greatest snow depth at any one time during the period of record was 3.0 inches. In most years, 0 days have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 4.0 inches, recorded on February 25, 1914.

The average relative humidity in mid-afternoon is about 54 percent. Humidity is higher at night, and the average at dawn is about 87 percent. The sun shines 68 percent of the time possible in summer and 53 percent in winter. The prevailing wind is from the east-northeast. Average wind speed is highest, 7.7 miles per hour, in March.

History

Stewart County was named in honor of General Daniel Stewart, an officer in the Revolutionary War and the War of 1812 and grandfather of President Theodore Roosevelt (University of Georgia, 2005). The county was created from Randolph County on December 23, 1830, by an act of the General Assembly. Portions of Stewart County were used to create Quitman County in 1858. The seat of government for Stewart County is the city of Lumpkin, which was named in honor of Wilson Lumpkin, Governor, Congressman, and Senator.

The Woodland, Mississippian, and Creek Indians all inhabited the area that is now Stewart County. Many areas of the Chattahoochee River were occupied by Native American tribes. Native Americans frequently practiced subsistence farming, abandoned residential areas after a few years, and resettled a short distance downriver or along other creeks.

Two of the six largest Indian mounds in Georgia are in Stewart County. Rood’s Landing is in the county and may have been the largest population center along the river during the Mississippian Period (circa 1000 to 1600). The site features eight mounds constructed in stages over several hundred years.

Two of the earliest towns in Stewart County settled by Europeans were located along the river. One of these towns was Roanoke. In 1835, Roanoke had a population of 600 settlers and played a pivotal role in the second Creek War. A large group of Creek warriors, angered by constant encroachment on their land, destroyed the town on May 15, 1836. After the attack, frightened settlers sought refuge at Fort Jones, which was occupied by solders from Stewart County. A historical marker on Highway 39 shows the approximate location of the fort. Some of the survivors of Roanoke relocated to nearby Florence. At its peak, Florence was a major shipping point on the river. The town was linked to Alabama by a covered bridge and had a newspaper, bank, and hotel. After a flood washed away the bridge in 1846 and the town was bypassed by railroad construction, the town began to languish and within a few decades was abandoned.

Farming

The first farmers who settled Stewart County fed their families by planting corn, rice, Irish potatoes, and sweet potatoes. Other subsistence crops were oats, rye, wheat, and berries. Cane was grown to make syrup. Cattle and hogs grazed in open woodlands.

Historically, cotton was the main crop until infestation by boll weevils caused the abandonment of single-crop farming. After the arrival of boll weevils, other crops, such as peanuts and corn, were placed in rotation in cropping systems and emerged as important money crops.

Erosion and low soil fertility have been the most important management concerns on farmland in Stewart County. In the early 1900s, farming became more intensive and tenant-type farming became widespread. The economic depression in the early 1930s marked the worst damage to the land. Many acres were farmed without conservation practices. As a result, excessive erosion occurred on the rolling topography.

A popular legend in Stewart County connects the origin of the gullies in Providence Canyon State Park to water dripping from the roof of a barn in the early 1800s. The canyon actually began forming as a result of poor soil management practices (Joyce, 1985). When the region was settled, most of the original forest was cleared for farming. The natural vegetative cover was removed, which allowed runoff to flow unchecked across bare soil and to form gullies. Due to the highly erodible geological formations in the area, the gullies gradually widened and deepened to form the canyon as it is today (fig. 2).

In 2008, the main crops in Stewart County were cotton and peanuts. Corn, rye, grain sorghum, and wheat were also grown. Some of the cotton and peanuts were planted by conservation tillage or strip tillage. Irrigation was used where water was available. Irrigation was typically by center pivot systems or cable tow systems.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; and the kinds of crops and

Figure 2.—The canyon wall in Providence Canyon State Park as viewed from the canyon floor in an area of Gullied land-Nankin-Ailey complex, 15 to 90 percent slopes, severely eroded.

native plants. They dug many holes to study the soil profle, which is the sequence of natural layers, or horizons, in a soil. The profle extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specifc segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specifc location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are suffcient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defned limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classifcation used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profle. After the soil scientists classifed and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confrm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the feld-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are feld tested through observation of the soils in different uses and under different levels of management. Some interpretations are modifed to ft local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and feld experience of specialists. For example, data on crop yields under defned levels of management are assembled from farm records and from feld or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specifc level in the soil on a specifc date.

After soil scientists located and identifed the signifcant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identifed each as a specifc map unit. Aerial photographs show trees, buildings, felds, roads, and rivers, all of which help in locating boundaries accurately.

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Kinston-Bibb

Poorly drained soils that are predominantly loamy throughout; on long, narrow flood plains

Setting

Location: Along Grass, Hodchodkee, Pataula, and Slaughter Creeks and on narrow branches to these and other creeks
Landscape: Coastal Plain
Landform: Flood plains
Slope: 0 to 2 percent

Composition

Percent of Stewart County: 1 percent
Kinston soils: 41 percent
Bibb soils: 34 percent
Minor components: 25 percent

Characteristics of the Kinston Soils

Depth class: Very deep
Drainage class: Poorly drained
Seasonal high water table: Apparent, at the surface to a depth of 1 foot from December through May in most years
Parent material: Stratified loamy and sandy alluvium

Typical profile
Surface layer:
0 to 3 inches—dark gray loam; yellowish red mottles
3 to 8 inches—very dark gray silt loam; yellowish red mottles
Subsoil:
8 to 15 inches—dark gray clay loam

Substratum:

15 to 33 inches—very dark gray sandy loam; pale brown and light brownish gray mottles
33 to 52 inches—dark gray sandy clay loam
52 to 80 inches—dark gray loamy sand

Characteristics of the Bibb Soils

Depth class: Very deep
Drainage class: Poorly drained
Seasonal high water table: Apparent, at a depth of 1/2 to 1 foot from December through May in most years
Parent material: Stratified loamy and sandy alluvium

Typical profile
Surface layer:
0 to 5 inches—very dark gray fine sandy loam
Underlying material:
5 to 8 inches—dark gray loam; strong brown mottles
8 to 13 inches—dark gray sandy loam; strong brown mottles
13 to 21 inches—light brownish gray sandy loam; pale brown, brownish yellow, and light yellowish brown mottles
21 to 27 inches—gray sandy loam; light yellowish brown mottles
27 to 45 inches—very dark gray sandy loam
45 to 63 inches—very dark gray and light brownish gray stratified sand to sandy loam
63 to 80 inches—dark gray loamy sand

Minor soils

- Well drained Nankin and Cowarts soils, which are in the higher positions on side slopes
- Moderately well drained Goldsboro soils, which are in the higher positions
- Somewhat poorly drained Ocilla soils, which are in the higher positions
- Poorly drained Rains soils, which are in positions similar to those of the major soils or slightly higher

2. Ochlockonee-Bibb-Iuka

Well drained, poorly drained, and moderately well drained soils that are loamy throughout; on long, narrow flood plains

Setting

Location: Along Hannahatchee Creek and on narrow branches to this and other creeks
Landscape: Coastal Plain
Landform: Flood plains
Slope: 0 to 3 percent

Composition

Percent of Stewart County: 1 percent
Ochlockonee soils: 24 percent
Bibb soils: 18 percent
Iuka soils: 14 percent
Minor components: 44 percent

Characteristics of the Ochlockonee Soils

Depth class: Very deep
Drainage class: Well drained

Seasonal high water table: Apparent, at a depth of 3 to 5 feet from December through April in most years
Parent material: Loamy alluvium

Typical profile
Surface layer:
0 to 4 inches—very dark grayish brown loamy fine sand
Underlying material:
4 to 32 inches—brownish yellow, light yellowish brown, and yellowish red stratified sand to sandy loam
32 to 62 inches—light yellowish brown, brownish yellow, pale brown, and very pale brown fine sandy loam
62 to 80 inches—light gray and gray loamy sand; brownish yellow mottles

Characteristics of the Bibb Soils

Depth class: Very deep
Drainage class: Poorly drained
Seasonal high water table: Apparent, at a depth of $^{1}/_{2}$ to 1 foot from December through April in most years
Parent material: Stratified loamy and sandy alluvium

Typical profile
Surface layer:
0 to 5 inches—very dark gray fine sandy loam
Underlying material:
5 to 8 inches—dark gray loam; strong brown mottles
8 to 13 inches—dark gray sandy loam; strong brown mottles
13 to 21 inches—light brownish gray sandy loam; pale brown, brownish yellow, and light yellowish brown mottles
21 to 27 inches—gray sandy loam; light yellowish brown mottles
27 to 45 inches—very dark gray sandy loam
45 to 63 inches—very dark gray and light brownish gray stratified sand to sandy loam
63 to 80 inches—dark gray loamy sand

Characteristics of the Iuka Soils

Depth class: Very deep
Drainage class: Moderately well drained
Seasonal high water table: Apparent, at a depth of 1 to 3 feet from December through April in most years
Parent material: Stratified loamy and sandy alluvium

Typical profile
Surface layer:
0 to 3 inches—dark grayish brown loamy fine sand
Underlying material:
3 to 28 inches—yellowish brown, brownish yellow, and strong brown stratified fine sand to fine sandy loam
28 to 34 inches—very pale brown and pale brown fine sandy loam; brownish yellow and light brownish gray mottles
34 to 80 inches—gray and light gray fine sandy loam; reddish yellow, light yellowish brown, and yellowish red mottles

Minor soils

- Well drained Bonneau soils, which are in the higher positions
- Well drained Nankin and Cowarts soils, which are in the higher positions on side slopes

- Moderately well drained Goldsboro soils, which are in positions similar to those of the major soils or slightly higher
- Somewhat poorly drained Ocilla soils, which are in positions similar to those of the major soils

3. Kolomoki-Wahee

Well drained and somewhat poorly drained, nearly level soils that have a loamy surface layer and a clayey subsoil; on river terraces

Setting

Location: River terraces along the Chattahoochee River
Landscape: Coastal Plains
Landform: River and stream terraces (fig. 3)
Slope: 0 to 2 percent

Composition

Percent of Stewart County: 3 percent
Kolomoki soils: 28 percent
Wahee soils: 19 percent
Minor components: 53 percent

Characteristics of the Kolomoki Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 6 feet
Parent material: Clayey and sandy alluvial sediments

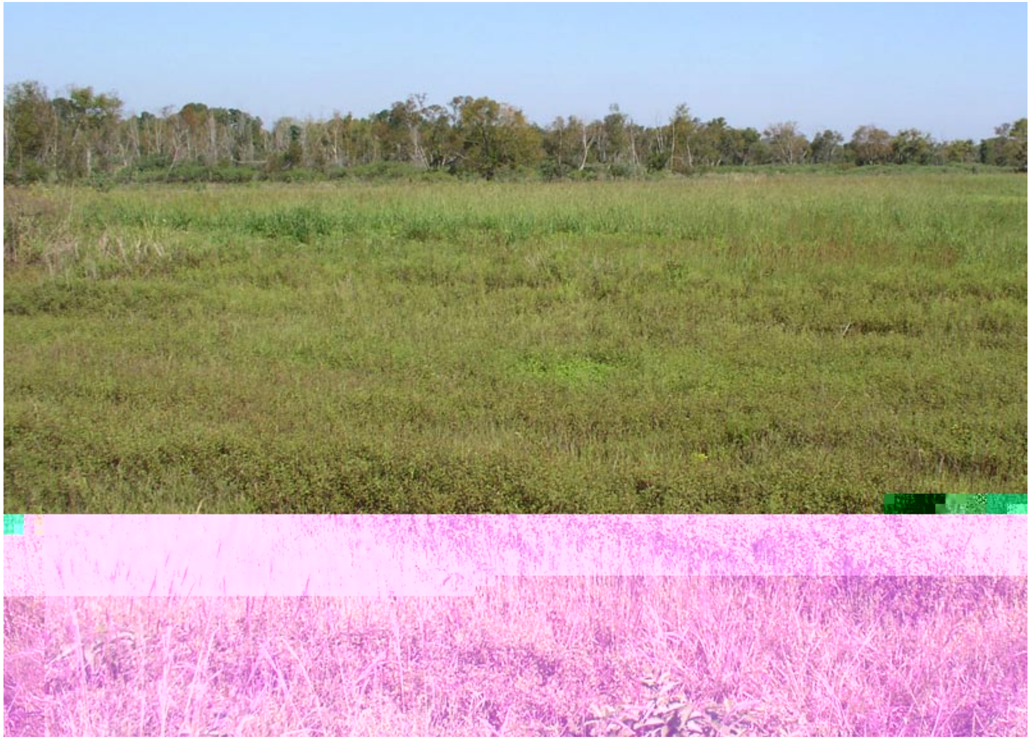

Figure 3.—An area of the Kolomoki-Wahee general soil map unit. This area is in Eufaula National Wildlife Refuge and is used for wildlife habitat.

Typical profile

Surface layer:

0 to 9 inches—brown fine sandy loam

Subsoil:

9 to 13 inches—yellowish red sandy clay loam

13 to 28 inches—red sandy clay

28 to 41 inches—yellowish red sandy clay

41 to 48 inches—strong brown sandy loam

Substratum:

48 to 72 inches—strong brown loamy coarse sand

Characteristics of the Wahee Soils

Depth class: Very deep

Drainage class: Somewhat poorly drained

Seasonal high water table: Apparent, at a depth of $^1/_2$ to $1^1/_2$ feet from December to March in most years

Parent material: Clayey alluvial sediments

Typical profile

Surface layer:

0 to 5 inches—gray fine sandy loam

Subsurface layer:

5 to 18 inches—pale brown fine sandy loam

Subsoil:

18 to 24 inches—pale brown sandy clay

24 to 32 inches—grayish brown sandy clay; yellowish brown and red mottles

Substratum:

32 to 72 inches—grayish brown sandy clay; yellowish brown mottles

Minor soils

- Well drained Orangeburg soils, which are in the higher positions
- Poorly drained Chastain soils, which are in the lower positions on flood plains
- Poorly drained Rains soils, which are in the lower positions
- Well drained Lucy soils, which are in the higher positions

4. Orangeburg-Bonneau-Norfolk

Well drained, nearly level and gently sloping soils that have a sandy or loamy surface layer and a loamy subsoil; on broad ridges

Setting

Location: East of the Chattahoochee River

Landscape: Coastal Plains

Landform: Broad interstream divides (fig. 4)

Slope: 0 to 8 percent

Composition

Percent of Stewart County: 5 percent

Orangeburg soils: 25 percent

Bonneau soils: 17 percent

Norfolk soils: 11 percent

Minor components: 47 percent

Figure 4.—An area of the Orangeburg-Bonneau-Norfolk general soil map unit. These soils are capable of producing high yields of cotton, peanuts, and corn.

Characteristics of the Orangeburg Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 6 feet
Parent material: Loamy marine sediments

Typical profile
Surface layer:
0 to 7 inches—dark brown loamy sand
Subsoil:
7 to 12 inches—yellowish red sandy loam
12 to 80 inches—red sandy clay loam

Characteristics of the Bonneau Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: Apparent, at a depth of 4 to 6 feet from December to March in most years
Parent material: Loamy marine sediments

Typical profile
Surface layer:
0 to 6 inches—dark grayish brown loamy sand
Subsurface layer:
6 to 12 inches—light yellowish brown loamy sand
12 to 22 inches—yellowish brown loamy sand
22 to 33 inches—yellowish brown loamy sand
Subsoil:
33 to 52 inches—yellowish brown sandy loam
52 to 65 inches—light yellowish brown sandy loam; yellowish brown and very pale brown mottles
65 to 72 inches—light yellowish brown sandy clay

Characteristics of the Norfolk Soils

Depth class: Very deep
Drainage class: Well drained

10 to 16 inches—yellowish brown sandy clay loam; strong brown mottles
16 to 34 inches—yellowish red sandy clay
34 to 39 inches—yellowish red sandy clay; red mottles
39 to 44 inches—strong brown sandy clay loam; yellowish red mottles

Substratum:
44 to 55 inches—yellowish brown sandy loam; red mottles
55 to 80 inches—yellowish brown sandy loam; light brownish gray and red mottles

Characteristics of the Bonneau Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: Apparent, at a depth of 4 to 6 feet from December to March in most years
Parent material: Loamy marine sediments

Typical profile
Surface layer:
0 to 6 inches—dark grayish brown loamy sand
Subsurface layer:
6 to 12 inches—light yellowish brown loamy sand
12 to 22 inches—yellowish brown loamy sand
22 to 33 inches—yellowish brown loamy sand
Subsoil:
33 to 52 inches—yellowish brown sandy loam
52 to 65 inches—light yellowish brown sandy loam; yellowish brown and very pale brown mottles
65 to 72 inches—light yellowish brown sandy clay

Characteristics of the Blanton Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: Perched, at a depth of 4 to 6 feet from December through March in most years
Parent material: Loamy marine sediments

Typical profile
Surface layer:
0 to 3 inches—light brownish gray loamy sand
Subsurface layer:
3 to 18 inches—yellow loamy sand
18 to 48 inches—brownish yellow loamy sand
Subsoil:
48 to 54 inches—strong brown sandy loam
54 to 58 inches—light yellowish brown sandy loam; yellowish red mottles
58 to 72 inches—light yellowish brown sandy loam; light gray mottles

Minor soils

- Well drained Orangeburg soils, which are in the higher positions
- Well drained Ailey soils, which are in positions similar to those of the major soils
- Well drained Cowarts soils, which are in positions similar to those of the major soils
- Moderately well drained Goldsboro soils, which are in the lower positions
- Well drained Norfolk soils, which are in the higher positions
- Well drained Benevolence soils, which are in the higher positions

6. Nankin-Cowarts

Well drained, moderately sloping to steep soils that have a sandy surface layer and a loamy or clayey subsoil; on ridges and side slopes

Setting

Location: Primarily in the western and northern parts of the county
Landscape: Coastal Plain
Landform: Interfluves and hillslopes
Slope: 8 to 45 percent

Composition

Percent of Stewart County: 47 percent
Nankin soils: 43 percent
Cowarts soils: 25 percent
Minor components: 32 percent

Characteristics of the Nankin Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 5 feet
Parent material: Loamy and clayey marine sediments

Typical profile
Surface layer:
0 to 4 inches—very dark grayish brown loamy sand
Subsoil:
4 to 10 inches—dark yellowish brown sandy loam
10 to 16 inches—yellowish brown sandy clay loam; strong brown mottles
16 to 34 inches—yellowish red sandy clay
34 to 39 inches—yellowish red sandy clay; red mottles
39 to 44 inches—strong brown sandy clay loam; yellowish red mottles
Substratum:
44 to 55 inches—yellowish brown sandy loam; red mottles
55 to 80 inches—yellowish brown sandy loam; light brownish gray and red mottles

Characteristics of the Cowarts Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 5 feet
Parent material: Loamy marine sediments

Typical profile
Surface layer:
0 to 7 inches—dark grayish brown and brown loamy sand
Subsoil:
7 to 15 inches—yellowish brown sandy loam
15 to 22 inches—brownish yellow sandy clay loam
22 to 40 inches—brownish yellow sandy clay loam; yellowish red mottles
Substratum:
40 to 59 inches—brownish yellow sandy loam; yellowish red, reddish yellow, and pale brown mottles
59 to 80 inches—about 50 percent brownish yellow, 30 percent light yellowish brown, and 20 percent yellowish red loamy sand

Minor soils

- Well drained Maubila soils, which are in positions similar to those of the major soils and have a faggy or gravely surface or subsurface layer
- Well drained Orangeburg soils, which are in the higher positions
- Poorly drained Kinston and Bibb soils, which are in the lower positions on food plains
- Well drained Ailey soils, which are in positions similar to those of the major soils and have a dense, brittle subsoil
- Somewhat excessively drained Troup soils, which are in the higher positions

7. Nankin-Orangeburg-Cowarts

Well drained, very gently sloping to very steep soils that have a sandy surface layer and a loamy or clayey subsoil; on narrow and broad ridges and on side slopes

Setting

Location: Central and eastern parts of the county
Landscape: Coastal Plain
Landform: Interfuves and broad interstream divides
Slope: 2 to 45 percent

Composition

Percent of Stewart County: 26 percent
Nankin soils: 24 percent
Orangeburg soils: 20 percent
Cowarts soils: 18 percent
Minor components: 38 percent

Characteristics of the Nankin Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 5 feet
Parent material: Loamy and clayey marine sediments

Typical profile
Surface layer:
0 to 4 inches—very dark grayish brown loamy sand
Subsoil:
4 to 10 inches—dark yellowish brown sandy loam
10 to 16 inches—yellowish brown sandy clay loam; strong brown mottles
16 to 34 inches—yellowish red sandy clay
34 to 39 inches—yellowish red sandy clay; red mottles
39 to 44 inches—strong brown sandy clay loam; yellowish red mottles
Substratum:
44 to 55 inches—yellowish brown sandy loam; red mottles
55 to 80 inches—yellowish brown sandy loam; light brownish gray and red mottles

Characteristics of the Orangeburg Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 6 feet
Parent material: Loamy marine sediments

Typical profile

Surface layer:

0 to 7 inches—dark brown loamy sand

Subsoil:

7 to 12 inches—yellowish red sandy loam

12 to 80 inches—red sandy clay loam

Characteristics of the Cowarts Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 5 feet
Parent material: Loamy marine sediments

Typical profile

Surface layer:

0 to 7 inches—dark grayish brown and brown loamy sand

Subsoil:

7 to 15 inches—yellowish brown sandy loam

15 to 22 inches—brownish yellow sandy clay loam

22 to 40 inches—brownish yellow sandy clay loam; yellowish red mottles

Substratum:

40 to 59 inches—brownish yellow sandy loam; yellowish red, reddish yellow, and pale brown mottles

59 to 80 inches—about 50 percent brownish yellow, 30 percent light yellowish brown, and 20 percent yellowish red loamy sand

Minor soils

- Well drained Bonneau soils, which are in positions similar to those of the major soils
- Poorly drained Kinston and Bibb soils, which are in the lower positions on food plains
- Well drained Maubila soils, which are in positions similar to those of the major soils and have a faggy or gravely surface or subsurface layer
- Well drained Ailey soils, which are in positions similar to those of the major soils and have a dense, brittle subsoil
- Somewhat excessively drained Troup soils, which are in the higher positions

8. Orangeburg-Greenville

Well drained, nearly level to strongly sloping soils that have a sandy or loamy surface layer and a loamy or clayey subsoil; on broad ridges and on side slopes

Setting

Location: Eastern parts of the county
Landscape: Coastal Plain
Landform: Broad interstream divides
Slope: 0 to 15 percent

Composition

Percent of Stewart County: 7 percent

Orangeburg soils: 38 percent

Greenville soils: 23 percent

Minor components: 39 percent

Characteristics of the Orangeburg Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 6 feet
Parent material: Loamy marine sediments

Typical profile
Surface layer:
0 to 7 inches—dark brown loamy sand
Subsoil:
7 to 12 inches—yellowish red sandy loam
12 to 80 inches—red sandy clay loam

Characteristics of the Greenville Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 6 feet
Parent material: Clayey marine sediments

Typical profile
Surface layer:
0 to 8 inches—dark reddish brown sandy clay loam
Subsoil:
8 to 45 inches—dark red sandy clay
45 to 80 inches—dark red sandy clay

Minor soils

- Well drained Nankin and Cowarts soils, which are in the slightly lower positions
- Well drained Red Bay soils, which are in positions similar to those of the major soils
- Well drained Faceville soils, which are in positions similar to those of the major soils
- Well drained Lucy soils, which are in the higher positions
- Somewhat excessively drained Troup soils, which are in the higher positions

9. Troup-Nankin-Cowarts

Somewhat excessively drained and well drained, very gently sloping to steep soils that have a sandy surface layer and a loamy or clayey subsoil; on broad ridges and on side slopes

Setting

Location: Predominately in the northeastern and southeastern parts of the county
Landscape: Coastal Plain
Landform: Broad interstream divides and interfluves
Slope: 2 to 35 percent

Composition

Percent of Stewart County: 6 percent
Troup soils: 37 percent
Nankin soils: 14 percent
Cowarts soils: 9 percent
Minor components: 40 percent

Characteristics of the Troup Soils

Depth class: Very deep
Drainage class: Somewhat excessively drained

Seasonal high water table: None within a depth of 6 feet
Parent material: Sandy and loamy marine sediments

Typical profile
Surface layer:
0 to 9 inches—brown sand
Subsurface layer:
9 to 50 inches—strong brown sand
50 to 60 inches—yellowish red sand
Subsoil:
60 to 80 inches—red sandy loam

Characteristics of the Nankin Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 5 feet
Parent material: Loamy and clayey marine sediments

Typical profile
Surface layer:
0 to 4 inches—very dark grayish brown loamy sand
Subsoil:
4 to 10 inches—dark yellowish brown sandy loam
10 to 16 inches—yellowish brown sandy clay loam; strong brown mottles
16 to 34 inches—yellowish red sandy clay
34 to 39 inches—yellowish red sandy clay; red mottles
39 to 44 inches—strong brown sandy clay loam; yellowish red mottles
Substratum:
44 to 55 inches—yellowish brown sandy loam; red mottles
55 to 80 inches—yellowish brown sandy loam; light brownish gray and red mottles

Characteristics of the Cowarts Soils

Depth class: Very deep
Drainage class: Well drained
Seasonal high water table: None within a depth of 5 feet
Parent material: Loamy marine sediments

Typical profile
Surface layer:
0 to 7 inches—dark grayish brown and brown loamy sand
Subsoil:
7 to 15 inches—yellowish brown sandy loam
15 to 22 inches—brownish yellow sandy clay loam
22 to 40 inches—brownish yellow sandy clay loam; yellowish red mottles
Substratum:
40 to 59 inches—brownish yellow sandy loam; yellowish red, reddish yellow, and pale brown mottles
59 to 80 inches—about 50 percent brownish yellow, 30 percent light yellowish brown, and 20 percent yellowish red loamy sand

Minor soils

- Well drained Orangeburg soils, which are in positions similar to those of the Troup soils or slightly lower
- Well drained Lucy soils, which are in positions similar to those of the Troup soils

- Well drained Ailey soils, which are in positions similar to those of the Nankin and Cowarts soils and have a dense, brittle subsoil
- Excessively drained Lakeland soils, which are in positions similar to those of the Troup soils or slightly higher

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specifc uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identifed and

Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Benevolence loamy sand, 5 to 8 percent slopes, is a phase of the Benevolence series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Nankin-Cowarts-Maubila complex, 15 to 45 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Kinston and Bibb soils, 0 to 1 percent slopes, frequently flooded, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits is an example.

Table 4 gives the acreage and proportionate extent of each map unit in the survey area. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

AeB—Ailey loamy sand, 2 to 5 percent slopes

Map Unit Composition

Major components
Ailey and similar soils: About 80 percent

Minor components
- Cowarts soils, which are in positions similar to those of the Ailey soil and do not have thick, sandy surface and subsurface layers
- Lakeland soils, which are in the slightly higher positions and are sandy throughout
- Lucy soils, which are in positions similar to those of the Ailey soil or slightly higher and do not have a dense subsoil layer
- Nankin soils, which are in positions similar to those of Ailey soil and have a clayey subsoil
- Troup soils, which are in the slightly higher positions and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Ailey Soil

Landform: Interfluves
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Slow
Available water capacity: Low
Depth class: Very deep
Land capability classification: 3s

Typical profile

Surface layer:

0 to 3 inches—brown loamy sand

Subsurface layer:

3 to 14 inches—light yellowish brown loamy sand

14 to 23 inches—yellowish brown loamy sand

Subsoil:

23 to 30 inches—strong brown sandy loam

30 to 42 inches—strong brown sandy clay loam

42 to 47 inches—strong brown sandy clay loam

Substratum:

47 to 80 inches—strong brown clay loam; light gray, red, and pale brown mottles

AeC—Ailey loamy sand, 5 to 8 percent slopes

Map Unit Composition

Major components

Ailey and similar soils: About 80 percent

Minor components

- Cowarts soils, which are in positions similar to those of the Ailey soil and do not have thick, sandy surface and subsurface layers
- Lakeland soils, which are in the slightly higher positions and are sandy throughout
- Lucy soils, which are in positions similar to those of the Ailey soil or slightly higher and do not have a dense subsoil layer
- Nankin soils, which are in positions similar to those of Ailey soil and have a clayey subsoil
- Troup soils, which are in the slightly higher positions and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Ailey Soil

Landform: Interfluves

Position on the landform: Backslopes

Parent material: Marine deposits

Drainage class: Well drained

Flooding: None

Ponding: None

Permeability: Slow

Available water capacity: Low

Depth class: Very deep

Land capability classification: 4s

Typical profile

Surface layer:

0 to 3 inches—brown loamy sand

Subsurface layer:

3 to 14 inches—light yellowish brown loamy sand

14 to 23 inches—yellowish brown loamy sand

Subsoil:

23 to 30 inches—strong brown sandy loam

30 to 42 inches—strong brown sandy clay loam

42 to 47 inches—strong brown sandy clay loam

Substratum:

47 to 80 inches—strong brown clay loam; light gray, red, and pale brown mottles

AoE—Ailey-Cowarts complex, 8 to 25 percent slopes

Map Unit Composition

Major components
Ailey and similar soils: About 60 percent
Cowarts and similar soils: About 30 percent

Minor components
- Lakeland soils, which are in positions similar to those of the Ailey and Cowarts soils or slightly higher and are sandy throughout
- Nankin soils, which are in positions similar to those of the Ailey and Cowarts soils and have a clayey subsoil
- Troup soils, which are in the slightly higher positions and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Ailey Soil

Landform: Interfuves
Position on the landform: Shoulders
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Slow
Available water capacity: Low
Depth class: Very deep
Land capability classification: 7e

Typical profile
Surface layer:
0 to 3 inches—brown loamy sand
Subsurface layer:
3 to 14 inches—light yellowish brown loamy sand
14 to 23 inches—yellowish brown loamy sand
Subsoil:
23 to 30 inches—strong brown sandy loam
30 to 42 inches—strong brown sandy clay loam
42 to 47 inches—strong brown sandy clay loam
Substratum:
47 to 80 inches—strong brown clay loam; light gray, red, and pale brown mottles

Characteristics of the Cowarts Soil

Landform: Interfuves
Position on the landform: Footslopes
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 6e

Typical profile
Surface layer:
0 to 7 inches—dark grayish brown and brown loamy sand

Subsoil:
7 to 15 inches—yellowish brown sandy loam
15 to 22 inches—brownish yellow sandy clay loam
22 to 40 inches—brownish yellow sandy clay loam; yellowish red mottles
Substratum:
40 to 59 inches—brownish yellow sandy loam; yellowish red and pale brown mottles
59 to 80 inches—about 50 percent brownish yellow, 30 percent light yellowish brown, and 20 percent yellowish red loamy sand

ArC—Arents reclaimed land, 0 to 8 percent slopes

Map Unit Composition

Major components
Arents and similar soils: About 70 percent

Minor components
- Cowarts soils, which are in lower positions than those of the Arents and have a sandy surface layer and a loamy subsoil
- Faceville soils, which are in positions similar to those of the Arents and have a loamy surface layer and a clayey subsoil
- Maubila soils, which are in positions similar to those of the Arents and have a loamy surface layer and a clayey subsoil
- Nankin soils, which are in lower positions than those of the Arents and have a sandy surface layer and a clayey subsoil
- Orangeburg soils, which are in positions similar to those of the Arents and have a sandy surface layer and a deep, loamy subsoil
- Red Bay soils, which are in positions similar to those of the Arents and have a sandy surface layer and a deep, loamy subsoil

Characteristics of the Arents

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Loamy marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 6e

Typical profile
0 to 14 inches—red sandy clay loam
14 to 80 inches—yellowish brown, yellowish red, reddish brown, and light gray sandy clay loam

BeB—Benevolence loamy sand, 0 to 5 percent slopes

Map Unit Composition

Major components
Benevolence and similar soils: About 85 percent

Minor components
- Lucy soils, which are in positions similar to those of the Benevolence soil and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches
- Lakeland soils, which are in the higher positions and are sandy throughout
- Orangeburg soils, which are in positions similar to those of the Benevolence soil and have a subsoil that contains slightly more clay
- Troup soils, which are in positions similar to those of the Benevolence soil or slightly higher and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Benevolence Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2e

Typical profile
Surface layer:
0 to 12 inches—brown loamy sand
Subsoil:
12 to 37 inches—yellowish red sandy loam
37 to 47 inches—red sandy loam
47 to 80 inches—red sandy clay loam

BeC—Benevolence loamy sand, 5 to 8 percent slopes

Map Unit Composition

Major components
Benevolence and similar soils: About 85 percent

Minor components
- Lucy soils, which are in positions similar to those of the Benevolence soil and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches
- Lakeland soils, which are in the higher positions and are sandy throughout
- Orangeburg soils, which are in positions similar to those of the Benevolence soil and have a subsoil that contains slightly more clay
- Troup soils, which are in positions similar to those of the Benevolence soil or slightly higher and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Benevolence Soil

Landform: Broad interstream divides
Position on the landform: Backslopes
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate

Depth class: Very deep
Land capability classification: 3e

Typical profile
Surface layer:
0 to 12 inches—brown loamy sand
Subsoil:
12 to 37 inches—yellowish red sandy loam
37 to 47 inches—red sandy loam
47 to 80 inches—red sandy clay loam

BnB—Blanton loamy sand, 0 to 5 percent slopes

Map Unit Composition

Major components
Blanton and similar soils: About 80 percent

Minor components
- Bonneau soils, which are in positions similar to those of the Blanton soil and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches
- Lucy soils, which are in positions similar to those of the Blanton soil or slightly higher, have a redder subsoil, and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches
- Troup soils, which are in positions similar to those of the Blanton soil or slightly higher and have a redder subsoil

Characteristics of the Blanton Soil

Landform: Interfluves
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Seasonal high water table: Perched, at a depth of about 4 to 6 feet
Flooding: None
Ponding: None
Permeability: Moderately slow
Available water capacity: Low
Depth class: Very deep
Land capability classification: 3s

Typical profile
Surface layer:
0 to 3 inches—light brownish gray loamy sand
Subsurface layer:
3 to 18 inches—yellow loamy sand
18 to 48 inches—brownish yellow loamy sand
Subsoil:
48 to 54 inches—strong brown sandy loam
54 to 58 inches—light yellowish brown sandy loam; yellowish red mottles
58 to 72 inches—light yellowish brown sandy loam; light gray mottles

BnC—Blanton loamy sand, 5 to 8 percent slopes

Map Unit Composition

Major components
Blanton and similar soils: About 80 percent

Minor components

- Bonneau soils, which are in positions similar to those of the Blanton soil and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches
- Lucy soils, which are in positions similar to those of the Blanton soil or slightly higher, have a redder subsoil, and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches
- Troup soils, which are in positions similar to those of the Blanton soil or slightly higher and have a redder subsoil

Characteristics of the Blanton Soil

Landform: Interfluves
Position on the landform: Backslopes
Parent material: Marine deposits
Drainage class: Well drained
Seasonal high water table: Perched, at a dept of about 4 to 6 feet
Flooding: None
Ponding: None
Permeability: Moderately slow
Available water capacity: Low
Depth class: Very deep
Land capability classification: 4s

Typical profile
Surface layer:
0 to 3 inches—light brownish gray loamy sand
Subsurface layer:
3 to 18 inches—yellow loamy sand
18 to 48 inches—brownish yellow loamy sand
Subsoil:
48 to 54 inches—strong brown sandy loam
54 to 58 inches—light yellowish brown sandy loam; yellowish red mottles
58 to 72 inches—light yellowish brown sandy loam; light gray mottles

BoB—Bonneau loamy sand, 0 to 5 percent slopes

Map Unit Composition

Major components
Bonneau and similar soils: About 85 percent

Minor components

- Lucy soils, which are in positions similar to those of the Bonneau soil or slightly higher and have a redder subsoil
- Norfolk soils, which are in positions similar to those of the Bonneau soil or slightly lower and do not have thick, sandy surface and subsurface layers
- Orangeburg soils, which are in positions similar to those of the Bonneau soil and do not have thick, sandy surface and subsurface layers
- Troup soils, which are in the slightly higher positions and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Bonneau Soil

Landform: Interfluves (fig. 5)
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Seasonal high water table: Apparent, at a depth of about 4 to 6 feet

Figure 5.—A broad area prepared for use as a wildlife food plot in an area of Bonneau loamy sand, 0 to 5 percent slopes.

Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2s

Typical profile
Surface layer:
0 to 6 inches—dark grayish brown loamy sand
Subsurface layer:
6 to 12 inches—light yellowish brown loamy sand
12 to 22 inches—yellowish brown loamy sand
22 to 33 inches—yellowish brown loamy sand
Subsoil:
33 to 52 inches—yellowish brown sandy loam
52 to 65 inches—light yellowish brown sandy loam; yellowish brown and very pale brown mottles
65 to 72 inches—light yellowish brown sandy clay

BoC—Bonneau loamy sand, 5 to 8 percent slopes

Map Unit Composition

Major components
Bonneau and similar soils: About 85 percent

Minor components
- Lucy soils, which are in positions similar to those of the Bonneau soil or slightly higher and have a redder subsoil
- Norfolk soils, which are in positions similar to those of the Bonneau soil or slightly lower and do not have thick, sandy surface and subsurface layers
- Orangeburg soils, which are in positions similar to those of the Bonneau soil and do not have thick, sandy surface and subsurface layers
- Troup soils, which are in the slightly higher positions and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Bonneau Soil

Landform: Interfluves
Position on the landform: Backslopes
Parent material: Marine deposits
Drainage class: Well drained
Seasonal high water table: Apparent, at a depth of about 4 to 6 feet
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 3s

Typical profile
Surface layer:
0 to 6 inches—dark grayish brown loamy sand
Subsurface layer:
6 to 12 inches—light yellowish brown loamy sand
12 to 22 inches—yellowish brown loamy sand
22 to 33 inches—yellowish brown loamy sand
Subsoil:
33 to 52 inches—yellowish brown sandy loam
52 to 65 inches—light yellowish brown sandy loam; yellowish brown and very pale brown mottles
65 to 72 inches—light yellowish brown sandy clay

ChA—Chastain loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Composition

Major components
Chastain and similar soils: About 80 percent

Minor components
- Kolomoki soils, which are in the higher positions and are well drained
- Wahee soils, which are in the slightly higher positions and are somewhat poorly drained
- A few areas of less clayey soils that are in positions similar to those of the Chastain soil

Characteristics of the Chastain Soil

Landform: Flood plains
Parent material: Alluvium
Drainage class: Poorly drained

Seasonal high water table: Apparent, at the surface to a depth of 1 foot
Flooding: Occasional
Ponding: None
Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 6w

Typical profile
Surface layer:
0 to 4 inches—dark grayish brown loam
Subsoil:
4 to 8 inches—dark grayish brown and grayish brown clay loam; strong brown mottles
8 to 18 inches—dark grayish brown clay; strong brown and gray mottles
18 to 32 inches—40 percent brown, 30 percent yellowish red, 20 percent dark gray, and 10 percent dark grayish brown clay
32 to 72 inches—gray clay; brownish yellow mottles

CoC—Cowarts loamy sand, 5 to 8 percent slopes

Map Unit Composition

Major components
Cowarts and similar soils: About 85 percent

Minor components
- Ailey soils, which are in positions similar to those of the Cowarts soil, have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches, and have dense, brittle lower layers
- Lucy soils, which are in positions similar to those of the Cowarts soil or slightly higher and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches
- Nankin soils, which are in positions similar to those of the Cowarts soil and have a clayey subsoil
- Norfolk soils, which are in the slightly higher positions and have a yellowish subsoil that extends to a depth of more than 60 inches
- Orangeburg soils, which are in the slightly higher positions and have a subsoil that extends to a depth of more than 60 inches
- Red Bay soils, which are in the slightly higher positions and have a dark red subsoil that extends to a depth of more than 60 inches
- Troup soils, which are in the higher positions and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Cowarts Soil

Landform: Interfluves
Position on the landform: Backslopes
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 3e

Typical profile
Surface layer:
0 to 7 inches—dark grayish brown and brown loamy sand
Subsoil:
7 to 15 inches—yellowish brown sandy loam
15 to 22 inches—brownish yellow sandy clay loam
22 to 40 inches—brownish yellow sandy clay loam; yellowish red mottles
Substratum:
40 to 59 inches—brownish yellow sandy loam; yellowish red and pale brown mottles
59 to 80 inches—about 50 percent brownish yellow, 30 percent light yellowish brown, and 20 percent yellowish red loamy sand

CyD—Cowarts-Maubila-Ailey complex, 5 to 15 percent slopes

Map Unit Composition

Major components
Cowarts and similar soils: About 40 percent
Maubila and similar soils: About 30 percent
Ailey and similar soils: About 15 percent

Minor components
- Faceville soils, which are in the slightly higher positions and have a subsoil that extends to a depth of more than 60 inches
- Greenville soils, which are in the slightly higher positions and have a dark red subsoil that extends to a depth of more than 60 inches
- Lucy soils, which are in positions similar to those Cowarts, Maubila, and Ailey soils or slightly higher and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches
- Nankin soils, which are in positions similar to those of the Cowarts soil and have a clayey subsoil
- Norfolk soils, which are in the slightly higher positions and have a yellowish subsoil that extends to a depth of more than 60 inches
- Orangeburg soils, which are in the slightly higher positions and have a subsoil that extends to a depth of more than 60 inches
- Red Bay soils, which are in the slightly higher positions and have a dark red subsoil that extends to a depth of more than 60 inches

Characteristics of the Cowarts Soil

Landform: Interfluves
Position on the landform: Backslopes
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 4e

Typical profile
Surface layer:
0 to 7 inches—dark grayish brown and brown loamy sand

Subsoil:
7 to 15 inches—yellowish brown sandy loam
15 to 22 inches—brownish yellow sandy clay loam
22 to 40 inches—brownish yellow sandy clay loam; yellowish red mottles
Substratum:
40 to 59 inches—brownish yellow sandy loam; yellowish red and pale brown mottles
59 to 80 inches—about 50 percent brownish yellow, 30 percent light yellowish brown, and 20 percent yellowish red loamy sand

Characteristics of the Maubila Soil

Landform: Interfluves
Position on the landform: Backslopes
Parent material: Marine deposits
Drainage class: Moderately well drained
Seasonal high water table: Perched, at a depth of about 2 to 3$^{1}/_{2}$ feet
Flooding: None
Ponding: None
Permeability: Very slow
Available water capacity: Low
Depth class: Very deep
Land capability classification: 6e

Typical profile
Surface layer:
0 to 4 inches—brown flaggy sandy loam
Subsoil:
4 to 26 inches—strong brown clay loam
26 to 40 inches—yellowish brown clay; red mottles
40 to 52 inches—yellowish brown clay; light red and gray mottles
52 to 57 inches—yellowish brown and brownish yellow clay; gray mottles
Substratum:
57 to 72 inches—yellowish brown and red clay; gray mottles

Characteristics of the Ailey Soil

Landform: Interfluves
Position on the landform: Backslopes
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Slow
Available water capacity: Low
Depth class: Very deep
Land capability classification: 4s

Typical profile
Surface layer:
0 to 3 inches—brown loamy sand
Subsurface layer:
3 to 14 inches—light yellowish brown loamy sand
14 to 23 inches—yellowish brown loamy sand
Subsoil:
23 to 30 inches—strong brown sandy loam
30 to 47 inches—strong brown sandy clay loam

Substratum:
47 to 80 inches—strong brown clay loam; light gray, red, and pale brown mottles

FeA—Faceville sandy loam, 0 to 2 percent slopes

Map Unit Composition

Major components
Faceville and similar soils: About 90 percent

Minor components
- Greenville soils, which are in positions similar to those of the Faceville soil and have a dark red subsoil
- Nankin soils, which are in the lower positions and have a thinner solum than that of the Faceville soil
- Orangeburg soils, which are in positions similar to those of the Faceville soil or slightly lower and have less clay in the subsoil

Characteristics of the Faceville Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 1

Typical profile
Surface layer:
0 to 10 inches—reddish brown sandy loam
Subsoil:
10 to 30 inches—red sandy clay
30 to 72 inches—red sandy clay
72 to 80 inches—red sandy clay; strong brown mottles

FeB—Faceville sandy loam, 2 to 5 percent slopes

Map Unit Composition

Major components
Faceville and similar soils: About 85 percent

Minor components
- Greenville soils, which are in positions similar to those of the Faceville soil and have a dark red subsoil
- Nankin soils, which are in the lower positions and have a thinner solum than that of the Faceville soil
- Orangeburg soils, which are in positions similar to those of the Faceville soil or slightly lower and have less clay in the subsoil

Characteristics of the Faceville Soil

Landform: Broad interstream divides (fg. 6)
Position on the landform: Summits

Figure 6.—Loblolly pines in an area of Faceville sandy loam, 2 to 5 percent slopes. This area has been managed with thinning and controlled burning.

Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2e

Typical profile
Surface layer:
0 to 10 inches—reddish brown sandy loam
Subsoil:
10 to 30 inches—red sandy clay
30 to 72 inches—red sandy clay
72 to 80 inches—red sandy clay; strong brown mottles

FeC—Faceville sandy loam, 5 to 8 percent slopes

Map Unit Composition

Major components
Faceville and similar soils: About 85 percent

Minor components
- Greenville soils, which are in positions similar to those of the Faceville soil and have a dark red subsoil

- Nankin soils, which are in the lower positions and have a thinner solum than that of the Faceville soil
- Orangeburg soils, which are in positions similar to those of the Faceville soil or slightly lower and have less clay in the subsoil

Characteristics of the Faceville Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate

Subsoil:
10 to 18 inches—light yellowish brown sandy loam
18 to 33 inches—light yellowish brown sandy clay loam; light gray and yellowish brown mottles
33 to 60 inches—light gray sandy clay loam; yellowish brown, red, and light gray mottles
60 to 80 inches—light gray sandy clay loam; light gray, yellowish brown, and red mottles

GrA—Grady clay loam, ponded

Map Unit Composition

Major components
Grady and similar soils: About 80 percent

Minor components
- Goldsboro soils, which are in the higher positions and are moderately well drained
- Norfolk soils, which are in the higher positions and are well drained
- Rains soils, which are less clayey than the Grady soil
- A few areas of soils that are in the slightly higher positions and are somewhat poorly drained
- A few areas of soils that have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches

Characteristics of the Grady Soil

Landform: Depressions
Parent material: Marine deposits
Drainage class: Poorly drained
Seasonal high water table: Apparent, at the surface to a depth of 1 foot
Flooding: None
Ponding: Frequent
Depth of ponding: 0.0 to 2.0 feet
Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 5w

Typical profile
Surface layer:
0 to 5 inches—very dark grayish brown clay loam
Subsoil:
5 to 10 inches—gray clay
10 to 30 inches—light brownish gray clay
30 to 65 inches—light brownish gray clay; yellowish brown and yellowish red mottles

GsA—Greenville sandy clay loam, 0 to 2 percent slopes

Map Unit Composition

Major components
Greenville and similar soils: About 90 percent

Minor components
- Faceville soils, which are in positions similar to those of the Greenville soil and have a subsoil that is less red

- Nankin soils, which are in the lower positions and have a thinner solum than that of the Greenville soil
- Orangeburg soils, which are in positions similar to those of the Greenville soil or slightly lower and have a subsoil that is less red and less clayey
- Red Bay soils, which are in positions similar to those of the Greenville soil or slightly lower and have less clay in the subsoil

Characteristics of the Greenville Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: High
Depth class: Very deep
Land capability classification: 1

Typical profile
Surface layer:
0 to 8 inches—dark reddish brown sandy clay loam
Subsoil:
8 to 45 inches—dark red sandy clay
45 to 80 inches—dark red sandy clay

GsB—Greenville sandy clay loam, 2 to 5 percent slopes

Map Unit Composition

Major components
Greenville and similar soils: About 85 percent

Minor components
- Faceville soils, which are in positions similar to those of the Greenville soil and have a subsoil that is less red
- Nankin soils, which are in the lower positions and have a thinner solum than that of the Greenville soil
- Orangeburg soils, which are in positions similar to those of the Greenville soil or slightly lower and have a subsoil that is less red and less clayey
- Red Bay soils, which are in positions similar to those of the Greenville soil or slightly lower and have less clay in the subsoil

Characteristics of the Greenville Soil

Landform: Broad interstream divides
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: High
Depth class: Very deep
Land capability classification: 2e

Typical profile
Surface layer:
0 to 8 inches—dark reddish brown sandy clay loam

Subsoil:
8 to 45 inches—dark red sandy clay
45 to 80 inches—dark red sandy clay

GsC—Greenville sandy clay loam, 5 to 8 percent slopes

Map Unit Composition

Major components
Greenville and similar soils: About 85 percent

Minor components
- Faceville soils, which are in positions similar to those of the Greenville soil and have a subsoil that is less red
- Nankin soils, which are in the lower positions and have a thinner solum than that of the Greenville soil
- Orangeburg soils, which are in positions similar to those of the Greenville soil or slightly lower and have a subsoil that is less red and less clayey
- Red Bay soils, which are in positions similar to those of the Greenville soil or slightly lower and have a subsoil that is less clayey

Characteristics of the Greenville Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: High
Depth class: Very deep
Land capability classification: 3e

Typical profile
Surface layer:
0 to 8 inches—dark reddish brown sandy clay loam
Subsoil:
8 to 45 inches—dark red sandy clay
45 to 80 inches—dark red sandy clay

GuF3—Gullied land-Nankin-Ailey complex, 15 to 90 percent slopes, severely eroded

Map Unit Composition

Major components
Gullied land: About 40 percent
Nankin and similar soils: About 25 percent
Ailey and similar soils: About 15 percent

Minor components
- Cowarts soils, which are in positions similar to those of Nankin and Ailey soils and have a subsoil that extends to a depth of 40 inches or less
- Faceville soils, which are in positions similar to those of the Nankin soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches

- Greenville soils, which are in positions similar to those of Nankin soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches
- Maubila soils, which are in positions similar to those of Nankin soil and have thin layers of indurated ironstone
- Orangeburg soils, which are in positions similar to those of Nankin and Ailey soils or higher and have a subsoil that extends to a depth of more than 60 inches

Characteristics of the Gullied land

Gullied land consists of areas that have been severely disturbed by erosion. Slopes are typically greater than 35 percent. Soil properties, such as texture, depth,

Subsoil:
23 to 30 inches—strong brown sandy loam
30 to 47 inches—strong brown sandy clay loam
Substratum:
47 to 80 inches—strong brown clay loam; light gray, red, and pale brown mottles

KBA—Kinston and Bibb soils, 0 to 1 percent slopes, frequently flooded

Map Unit Composition

Major components
Kinston and similar soils: About 45 percent
Bibb and similar soils: About 35 percent

Minor components
- Iuka soils, which are in the higher positions on the food plains and are moderately well drained
- Rains soils, which are in positions similar to those of the Kinston and Bibb soils or slightly higher and have a loamy subsoil
- A few area of soils that are in the slightly higher positions and are somewhat poorly drained

Characteristics of the Kinston Soil

Landform: Flood plains (fg. 7)
Parent material: Stratifed sandy and loamy alluvium

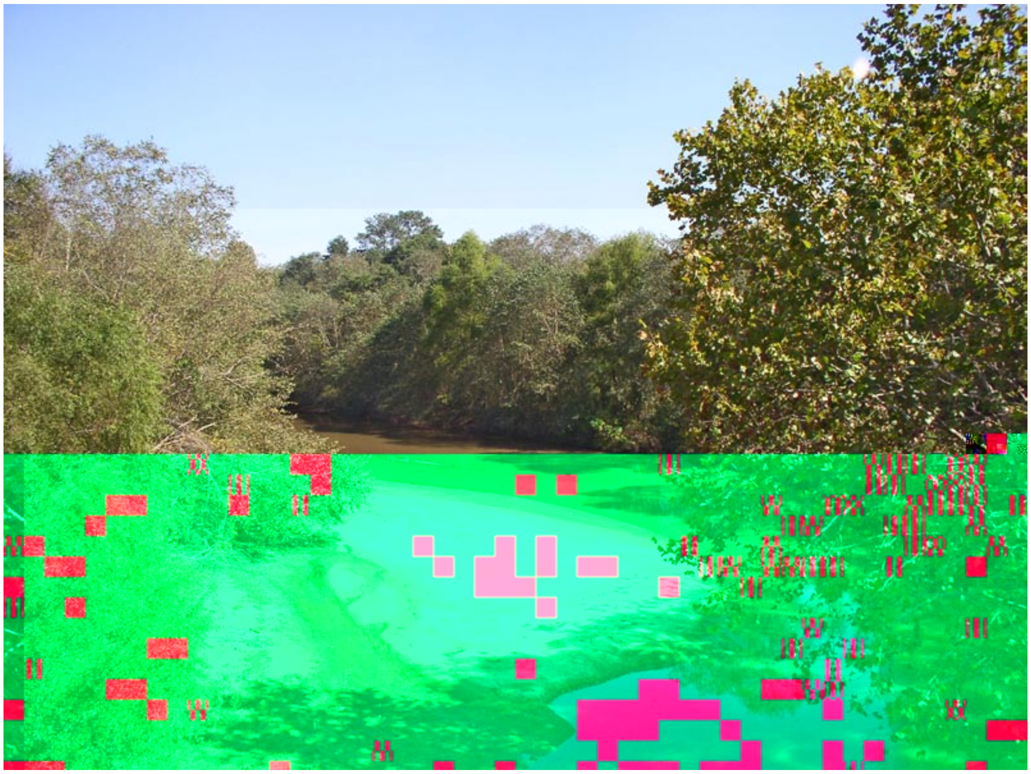

Figure 7.—An area of Kinston and Bibb soils, 0 to 1 percent slopes, frequently flooded. The common vegetation is water tolerant. These soils are unsuited to farming because of frequent flooding in winter and spring.

Drainage class: Poorly drained
Seasonal high water table: Apparent, at the surface to a depth of 1 foot
Flooding: Frequent
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 6w

Typical profile
Surface layer:
0 to 3 inches—dark gray loam; yellowish red mottles
3 to 8 inches—very dark gray silt loam; yellowish red mottles
Subsoil:
8 to 15 inches—dark gray clay loam
Substratum:
15 to 33 inches—very dark gray sandy loam; pale brown and light brownish gray mottles
33 to 52 inches—dark gray sandy clay loam; dark yellowish mottles
52 to 80 inches—dark gray loamy sand

Characteristics of the Bibb Soil

Landform: Flood plains
Parent material: Stratifed sandy and loamy alluvium
Drainage class: Poorly drained
Seasonal high water table: Apparent, at a depth of about $^1/_2$ to 1 foot
Flooding: Frequent
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 6w

Typical profile
Surface layer:
0 to 5 inches—very dark gray fne sandy loam
Underlying material:
5 to 8 inches—dark gray loam; strong brown mottles
8 to 13 inches—dark gray sandy loam; strong brown mottles
13 to 21 inches—light brownish gray sandy loam; pale brown, brownish yellow, and light yellowish brown mottles
21 to 27 inches—gray sandy loam; light yellowish brown mottles
27 to 45 inches—very dark gray sandy loam
45 to 63 inches—very dark gray and light brownish gray stratifed sand to sandy loam
63 to 80 inches—dark gray loamy sand

KoA—Kolomoki fine sandy loam, 0 to 2 percent slopes, rarely flooded

Map Unit Composition

Major components
Kolomoki and similar soils: About 80 percent

Minor components
- Chastain soils, which are in the lower positions on food plains and are poorly drained
- Wahee soils, which are in the slightly lower positions and are somewhat poorly drained
- A few areas of soils that have a subsoil of sandy clay loam
- A few small areas that are moderately well drained

Characteristics of the Kolomoki Soil

Landform: River terraces
Parent material: Alluvium
Drainage class: Well drained
Flooding: Rare
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 1

Typical profile
Surface layer:
0 to 9 inches—brown fne sandy loam
Subsoil:
9 to 13 inches—yellowish red sandy clay loam
13 to 28 inches—red sandy clay
28 to 41 inches—yellowish red sandy clay
41 to 48 inches—strong brown sandy loam
Substratum:
48 to 72 inches—strong brown loamy coarse sand

LkC—Lakeland sand, 0 to 8 percent slopes

Map Unit Composition

Major components
Lakeland and similar soils: About 85 percent

Minor components
- Ailey soils, which are in the lower positions, are well drained, and have a dense, brittle subsoil at a depth of 20 to 40 inches
- Benevolence soils, which are in the lower positions, are well drained, and have a loamy subsoil
- Blanton soils, which are in the slightly lower positions, are well drained, and have a loamy subsoil at a depth of 40 to 80
- Cowarts soils, which are in the lower positions, are well drained, and have a loamy subsoil
- Troup soils, which are in positions similar to those of the Lakeland soil or slightly lower, are somewhat excessively drained, and have a loamy subsoil at a depth of 40 to 80 inches

Characteristics of the Lakeland Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Excessively drained
Flooding: None

Ponding: None
Permeability: Rapid
Available water capacity: Very low
Depth class: Very deep
Land capability classification: 4s

Typical profile
Surface layer:
0 to 4 inches—dark yellowish brown sand
Underlying material:
4 to 60 inches—yellowish brown sand
60 to 80 inches—strong brown sand

LkD—Lakeland sand, 8 to 15 percent slopes

Map Unit Composition

Major components
Lakeland and similar soils: About 85 percent

Minor components
- Ailey soils, which are in the lower positions, are well drained, and have a dense, brittle subsoil at a depth of 20 to 40 inches
- Benevolence soils, which are in the lower positions, are well drained, and have a loamy subsoil
- Blanton soils, which are in the slightly lower positions, are well drained, and have a loamy subsoil at a depth of 40 to 80 inches
- Cowarts soils, which are in the lower positions, are well drained, and have a loamy subsoil
- Troup soils, which are in positions similar to those of the Lakeland soil, are somewhat excessively drained, and have a loamy subsoil at a depth of 40 to 80 inches

Characteristics of the Lakeland Soil

Landform: Broad interstream divides
Position on the landform: Backslopes
Parent material: Marine deposits
Drainage class: Excessively drained
Flooding: None
Ponding: None
Permeability: Rapid
Available water capacity: Very low
Depth class: Very deep
Land capability classification: 7s

Typical profile
Surface layer:
0 to 4 inches—dark yellowish brown sand
Underlying material:
4 to 60 inches—yellowish brown sand
60 to 80 inches—strong brown sand

LmB—Lucy loamy sand, 0 to 5 percent slopes

Map Unit Composition

Major components
Lucy and similar soils: About 85 percent

Minor components

- Ailey soils, which are in positions similar to those of the Lucy soil or slightly lower and have dense, brittle lower layers
- Bonneau soils, which are in the slightly lower positions and have a subsoil that is more yellow than the subsoil of the Lucy soil
- Norfolk soils, which are in the slightly lower positions, have a subsoil that is more yellow than the subsoil of the Lucy soil, and do not have thick, sandy surface and subsurface layers
- Orangeburg soils, which are in positions similar to those of the Lucy soil or slightly higher and do not have thick, sandy surface and subsurface layers
- Troup soils, which are in positions similar to those of Lucy soil or slightly higher and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Lucy Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2s

Typical profile
Surface layer:
0 to 8 inches—grayish brown loamy sand
Subsurface layer:
8 to 24 inches—brown loamy sand
Subsoil:
24 to 48 inches—yellowish red sandy loam
48 to 72 inches—red sandy clay loam

LmC—Lucy loamy sand, 5 to 8 percent slopes

Map Unit Composition

Major components
Lucy and similar soils: About 85 percent

Minor components

- Ailey soils, which are in positions similar to those of the Lucy soil or slightly lower and have dense, brittle lower layers
- Bonneau soils, which are in the slightly lower positions and have a subsoil that is more yellow than the subsoil of the Lucy soil
- Norfolk soils, which are in the slightly lower positions, have a subsoil that is more yellow than the subsoil of the Lucy soil, and do not have thick, sandy surface and subsurface layers
- Orangeburg soils, which are in positions similar to those of the Lucy soil or slightly higher and do not have thick, sandy surface and subsurface layers
- Troup soils, which are in positions similar to those of Lucy soil or slightly higher and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Lucy Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 3s

Typical profile
Surface layer:
0 to 8 inches—grayish brown loamy sand
Subsurface layer:
8 to 24 inches—brown loamy sand
Subsoil:
24 to 48 inches—yellowish red sandy loam
48 to 72 inches—red sandy clay loam

LmD—Lucy loamy sand, 8 to 15 percent slopes

Map Unit Composition

Major components
Lucy and similar soils: About 85 percent

Minor components
- Ailey soils, which are in positions similar to those of the Lucy soil or slightly lower and have dense, brittle lower layers
- Bonneau soils, which are in the slightly lower positions and have a subsoil that is more yellow than the subsoil of the Lucy soil
- Norfolk soils, which are in positions similar to those of the Lucy soil or slightly lower, have a subsoil that is more yellow than the subsoil of the Lucy soil, and do not have thick, sandy surface and subsurface layers
- Orangeburg soils, which are in positions similar to those of the Lucy soil or slightly higher and do not have the thick, sandy surface and subsurface layers
- Troup soils, which are in positions similar to those of the Lucy soil or slightly higher and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches

Characteristics of the Lucy Soil

Landform: Broad interstream divides
Position on the landform: Backslopes
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 4s

Typical profile

Surface layer:
  0 to 8 inches—grayish brown loamy sand
Subsurface layer:
  8 to 24 inches—brown loamy sand
Subsoil:
  24 to 48 inches—yellowish red sandy loam
  48 to 72 inches—red sandy clay loam

NcB—Nankin-Cowarts complex, 2 to 5 percent slopes

Map Unit Composition

Major components

Nankin and similar soils: About 60 percent
Cowarts and similar soils: About 25 percent

Minor components

- Faceville soils, which are in positions similar to those of the Nankin soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches
- Greenville soils, which are in positions similar to those of Nankin soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches
- Orangeburg soils, which are in positions similar to those of Cowarts soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches

Characteristics of the Nankin Soil

Landform: Interfluves
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderately slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2e

Typical profile

Surface layer:
  0 to 4 inches—very dark grayish brown loamy sand
Subsoil:
  4 to 10 inches—dark yellowish brown sandy loam
  10 to 16 inches—yellowish brown sandy clay loam; strong brown mottles
  16 to 34 inches—yellowish red sandy clay
  34 to 39 inches—yellowish red sandy clay; red mottles
  39 to 44 inches—strong brown sandy clay loam; yellowish red mottles
Substratum:
  44 to 55 inches—yellowish brown sandy loam; red mottles
  55 to 80 inches—yellowish brown sandy loam; light brownish gray and red mottles

Characteristics of the Cowarts Soil

Landform: Interfluves
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained

Flooding: None
Ponding: None
Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2e

Typical profile
Surface layer:
0 to 7 inches—dark grayish brown and brown loamy sand
Subsoil:
7 to 15 inches—yellowish brown sandy loam
15 to 22 inches—brownish yellow sandy clay loam
22 to 40 inches—brownish yellow sandy clay loam; yellowish red mottles
Substratum:
40 to 59 inches—brownish yellow sandy loam; yellowish red and pale brown mottles
59 to 80 inches—about 50 percent brownish yellow, 30 percent light yellowish brown, and 20 percent yellowish red loamy sand

NcD—Nankin-Cowarts complex, 5 to 15 percent slopes

Map Unit Composition

Major components
Nankin and similar soils: About 60 percent
Cowarts and similar soils: About 25 percent

Minor components
- Ailey soils, which are in positions similar to those of the Nankin and Cowarts soils or slightly higher, have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches, and have dense, brittle lower layers
- Faceville soils, which are in positions similar to those of the Nankin soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches
- Greenville soils, which are in positions similar to those of Nankin soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches
- Maubila soils, which are in positions similar to those of Nankin and Cowarts soils and have thin layers of indurated ironstone
- Orangeburg soils, which are in positions similar to those of Cowarts soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches

Characteristics of the Nankin Soil

Landform: Interfluves
Position on the landform: Backslopes (fig. 8)
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderately slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 4e

Typical profile
Surface layer:
0 to 4 inches—very dark grayish brown loamy sand

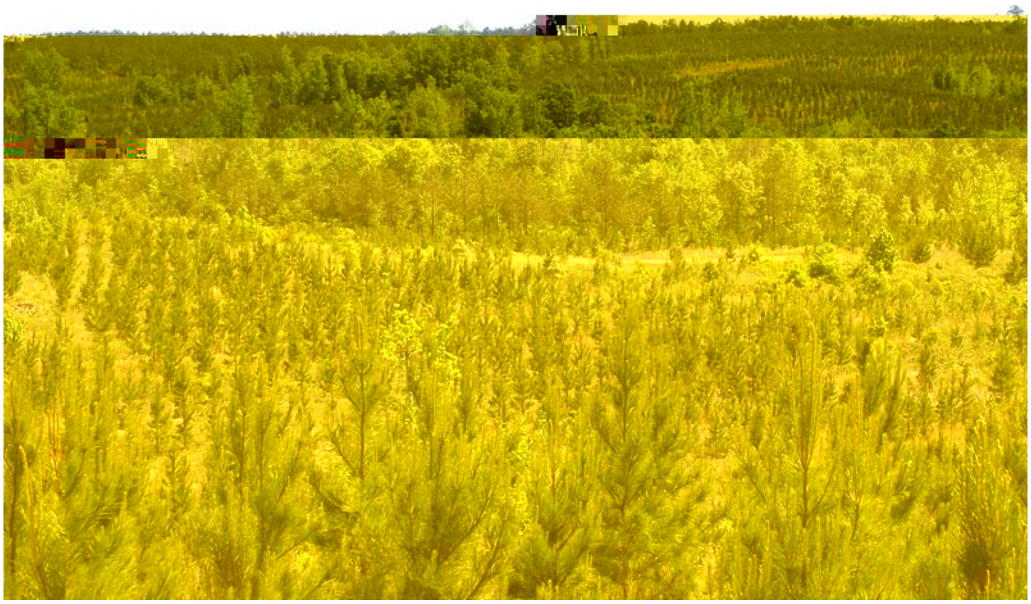

Figure 8.—Loblolly pines planted in an area of Nankin-Cowarts complex, 5 to 15 percent slopes.

Subsoil:
4 to 10 inches—dark yellowish brown sandy loam
10 to 16 inches—yellowish brown sandy clay loam; strong brown mottles
16 to 34 inches—yellowish red sandy clay
34 to 39 inches—yellowish red sandy clay; red mottles
39 to 44 inches—strong brown sandy clay loam; yellowish red mottles
Substratum:
44 to 55 inches—yellowish brown sandy loam; red mottles
55 to 80 inches—yellowish brown sandy loam; light brownish gray and red mottles

Characteristics of the Cowarts Soil

Landform: Interfuves
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 4e

Typical profile
Surface layer:
0 to 7 inches—dark grayish brown and brown loamy sand
Subsoil:
7 to 15 inches—yellowish brown sandy loam
15 to 22 inches—brownish yellow sandy clay loam
22 to 40 inches—brownish yellow sandy clay loam; yellowish red mottles
Substratum:
40 to 59 inches—brownish yellow sandy loam; yellowish red and pale brown mottles

59 to 80 inches—about 50 percent brownish yellow, 30 percent light yellowish brown, and 20 percent yellowish red loamy sand

NcF—Nankin-Cowarts complex, 15 to 35 percent slopes

Map Unit Composition

Major components
Nankin and similar soils: About 60 percent
Cowarts and similar soils: About 25 percent

Minor components
- Ailey soils, which are in positions similar to those of the Nankin and Cowarts soils or slightly higher, have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches, and have dense, brittle lower layers
- Faceville soils, which are in positions similar to those of the Nankin soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches
- Greenville soils, which are in positions similar to those of Nankin soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches
- Maubila soils, which are in positions similar to those of Nankin and Cowarts soils and have thin layers of indurated ironstone
- Orangeburg soils, which are in positions similar to those of Cowarts soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches

Characteristics of the Nankin Soil

Landform: Hillslopes
Position on the landform: Shoulders
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderately slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 6e

Typical profile
Surface layer:
0 to 4 inches—very dark grayish brown loamy sand
Subsoil:
4 to 10 inches—dark yellowish brown sandy loam
10 to 16 inches—yellowish brown sandy clay loam; strong brown mottles
16 to 34 inches—yellowish red sandy clay
34 to 39 inches—yellowish red sandy clay; red mottles
39 to 44 inches—strong brown sandy clay loam; yellowish red mottles
Substratum:
44 to 55 inches—yellowish brown sandy loam; red mottles
55 to 80 inches—yellowish brown sandy loam; light brownish gray and red mottles

Characteristics of the Cowarts Soil

Landform: Hillslopes
Position on the landform: Footslopes
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None

Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 6e

Typical profile
Surface layer:
0 to 7 inches—dark grayish brown and brown loamy sand
Subsoil:
7 to 15 inches—yellowish brown sandy loam
15 to 22 inches—brownish yellow sandy clay loam
22 to 40 inches—brownish yellow sandy clay loam; yellowish red mottles
Substratum:
40 to 59 inches—brownish yellow sandy loam; yellowish red and pale brown mottles
59 to 80 inches—about 50 percent brownish yellow, 30 percent light yellowish brown, and 20 percent yellowish red loamy sand

NmF—Nankin-Cowarts-Maubila complex, 15 to 45 percent slopes

Map Unit Composition

Major components
Nankin and similar soils: About 40 percent
Cowarts and similar soils: About 30 percent
Maubila and similar soils: About 15 percent

Minor components
- Ailey soils, which are in positions similar to those of the Nankin and Cowarts soils or slightly higher, have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches, and have dense, brittle lower layers
- Faceville soils, which are in positions similar to those of the Nankin soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches
- Greenville soils, which are in positions similar to those of Nankin soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches
- Lucy soils, which are in positions similar to those of the Nankin, Cowarts, and Maubila soils or slightly higher and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches
- Norfolk soils, which are in the slightly higher positions and have a subsoil that is more yellow than the subsoils of the major soils and that extends to a depth of more than 60 inches
- Orangeburg soils, which are in positions similar to those of Cowarts soil or slightly higher and have a subsoil that extends to a depth of more than 60 inches
- Red Bay soils, which are in the slightly higher positions and have a dark red subsoil that extends to a depth of more than 60 inches

Characteristics of the Nankin Soil

Landform: Hillslopes
Position on the landform: Shoulders
Parent material: Clayey marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None

Permeability: Moderately slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 6e

Typical profile
Surface layer:
0 to 4 inches—very dark grayish brown loamy sand
Subsoil:
4 to 10 inches—dark yellowish brown sandy loam
10 to 16 inches—yellowish brown sandy clay loam; strong brown mottles
16 to 34 inches—yellowish red sandy clay
34 to 39 inches—yellowish red sandy clay; red mottles
39 to 44 inches—strong brown sandy clay loam; yellowish red mottles
Substratum:
44 to 55 inches—yellowish brown sandy loam; red mottles
55 to 80 inches—yellowish brown sandy loam; light brownish gray and red mottles

Characteristics of the Cowarts Soil

Landform: Hillslopes
Position on the landform: Footslopes
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 6e

Typical profile
Surface layer:
0 to 7 inches—dark grayish brown and brown loamy sand
Subsoil:
7 to 15 inches—yellowish brown sandy loam
15 to 22 inches—brownish yellow sandy clay loam
22 to 40 inches—brownish yellow sandy clay loam; yellowish red mottles
Substratum:
40 to 59 inches—brownish yellow sandy loam; yellowish red and pale brown mottles
59 to 80 inches—about 50 percent brownish yellow, 30 percent light yellowish brown, and 20 percent yellowish red loamy sand

Characteristics of the Maubila Soil

Landform: Hillslopes
Position on the landform: Shoulders
Parent material: Marine deposits
Drainage class: Moderately well drained
Seasonal high water table: Perched, at a depth of about 2 to 3$^1/_2$ feet
Flooding: None
Ponding: None
Permeability: Very slow

Available water capacity: Low
Depth class: Very deep
Land capability classification: 7e

Typical profile
Surface layer:
0 to 4 inches—brown flaggy sandy loam
Subsoil:
4 to 26 inches—strong brown clay loam
26 to 40 inches—yellowish brown clay; red mottles
40 to 52 inches—yellowish brown clay; light red and gray mottles
52 to 57 inches—yellowish brown and brownish yellow clay; gray mottles
Substratum:
57 to 72 inches—yellowish brown and red clay; gray mottles

NoA—Norfolk loamy sand, 0 to 2 percent slopes

Map Unit Composition

Major components
Norfolk and similar soils: About 85 percent

Minor components
- Orangeburg soils, which are in positions similar to those of the Norfolk soil or slightly higher and have a redder subsoil
- Nankin soils, which are in the lower positions, have a clayey subsoil, and have a thinner solum than that of the Norfolk soil
- A few areas of soils that are in positions similar to those of the Norfolk soil and have a clayey subsoil
- A few small areas of soils that are moderately well drained

Characteristics of the Norfolk Soil

Landform: Interfluves
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Seasonal high water table: Apparent, at a depth of about 4 to 6 feet
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 1

Typical profile
Surface layer:
0 to 6 inches—brown loamy sand
Subsoil:
6 to 10 inches—brownish yellow sandy loam
10 to 30 inches—yellowish brown sandy clay loam
30 to 55 inches—brownish yellow sandy clay loam
55 to 70 inches—brownish yellow sandy clay loam; yellowish red, strong brown, and light brownish gray mottles
70 to 80 inches—yellowish brown sandy loam; red, strong brown, brownish yellow, and light brownish gray mottles

NoB—Norfolk loamy sand, 2 to 5 percent slopes

Map Unit Composition

Major components
Norfolk and similar soils: About 80 percent

Minor components
- Orangeburg soils, which are in positions similar to those of the Norfolk soil or slightly higher and have a redder subsoil
- Nankin soils, which are in the lower positions, have a clayey subsoil, and have a thinner solum than that of the Norfolk soil
- A few areas of soils that are in positions similar to those of the Norfolk soil and have a clayey subsoil
- A few small areas of soils that are moderately well drained

Characteristics of the Norfolk Soil

Landform: Interfluves
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Seasonal high water table: Apparent, at a depth of about 4 to 6 feet
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2e

Typical profile
Surface layer:
0 to 6 inches—brown loamy sand
Subsoil:
6 to 10 inches—brownish yellow sandy loam
10 to 30 inches—yellowish brown sandy clay loam
30 to 55 inches—brownish yellow sandy clay loam
55 to 70 inches—brownish yellow sandy clay loam; yellowish red, strong brown, and light brownish gray mottles
70 to 80 inches—yellowish brown sandy loam; red, strong brown, brownish yellow, and light brownish gray mottles

OBB—Ochlockonee, Iuka, and Bibb soils, 0 to 5 percent slopes, frequently flooded

Map Unit Composition

Major components
Ochlockonee and similar soils: About 35 percent
Iuka and similar soils: About 25 percent
Bibb and similar soils: About 20 percent

Minor components
- Chastain soils, which are in positions similar to those of the major soils on flood plains, have a clayey subsoil, and are poorly drained
- Goldsboro soils, which are in upland positions and are moderately well drained
- Ocilla soils, which are in upland positions and are somewhat poorly drained
- Rains soils, which are in upland positions and are poorly drained

Characteristics of the Ochlockonee Soil

Landform: Flood plains
Parent material: Loamy alluvium
Drainage class: Well drained
Seasonal high water table: Apparent, at a depth of about 3 to 5 feet
Flooding: Frequent
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2w

Typical profile
Surface layer:
0 to 4 inches—very dark grayish brown loamy fine sand
Underlying material:
4 to 32 inches—brownish yellow, light yellowish brown, and yellowish red stratified sand to sandy loam
32 to 62 inches—light yellowish brown, brownish yellow, pale brown, and very pale brown fine sandy loam
62 to 80 inches—light gray and gray loamy sand; brownish yellow mottles

Characteristics of the Iuka Soil

Landform: Flood plains
Parent material: Stratified sandy and loamy alluvium
Drainage class: Moderately well drained
Seasonal high water table: Apparent, at a depth of about 1 to 3 feet
Flooding: Frequent
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2w

Typical profile
Surface layer:
0 to 3 inches—dark grayish brown loamy fine sand
Underlying material:
3 to 20 inches—yellowish brown, brownish yellow, and strong brown stratified fine sand to fine sandy loam
20 to 34 inches—very pale brown and pale brown fine sandy loam; brownish yellow and light brownish gray mottles
34 to 80 inches—gray and light gray fine sandy loam; reddish yellow, light yellowish brown, and yellowish red mottles

Characteristics of the Bibb Soil

Landform: Flood plains
Parent material: Stratified sandy and loamy alluvium
Drainage class: Poorly drained
Seasonal high water table: Apparent, at a depth of about $^1/_2$ to 1 foot
Flooding: Frequent
Ponding: None
Permeability: Moderate
Available water capacity: Moderate

Depth class: Very deep
Land capability classification: 6w

Typical profile
Surface layer:
0 to 5 inches—very dark gray fine sandy loam
Substratum:
5 to 8 inches—dark gray loam; strong brown mottles
8 to 13 inches—dark gray sandy loam; strong brown mottles
13 to 21 inches—light brownish gray sandy loam; pale brown, brownish yellow, and light yellowish brown mottles
21 to 27 inches—gray sandy loam; light yellowish brown mottles
Surface layer:
27 to 45 inches—very dark gray sandy loam
45 to 63 inches—very dark gray and light brownish gray stratified sand to sandy loam
63 to 80 inches—dark gray loamy sand

OcA—Ocilla loamy sand, 0 to 2 percent slopes

Map Unit Composition

Major components
Ocilla and similar soils: About 80 percent

Minor components
- Cowarts soils, which are in the higher positions, are well drained, and have a solum that is less than 40 inches thick
- Goldsboro soils, which are in the slightly higher positions and are moderately well drained
- Kinston and Bibb soils, which are in the lower positions on flood plains and are poorly drained
- Norfolk soils, which are in the higher positions and are well drained
- Rains soils, which are in the lower positions and are poorly drained
- A few areas of soils that have a loamy subsoil within a depth of 20 inches

Characteristics of the Ocilla Soil

Landform: Stream terraces
Position on the landform: Toeslopes
Parent material: Loamy marine deposits, sandy marine deposits, or both
Drainage class: Somewhat poorly drained
Seasonal high water table: Apparent, at a depth of about 1 to 2$^1/_2$ feet
Flooding: None
Ponding: None
Permeability: Moderately slow
Available water capacity: Low
Depth class: Very deep
Land capability classification: 3w

Typical profile
Surface layer:
0 to 10 inches—grayish brown loamy sand
Subsurface layer:
10 to 24 inches—light brownish gray loamy sand

Subsoil:
24 to 32 inches—yellowish brown sandy clay loam; strong brown and light brownish gray mottles
32 to 40 inches—light brownish gray sandy clay loam; strong brown and yellowish red mottles
40 to 58 inches—light brownish gray sandy clay loam; strong brown and red mottles
58 to 72 inches—light brownish gray sandy clay loam; brownish yellow mottles

OeA—Orangeburg loamy sand, 0 to 2 percent slopes

Map Unit Composition

Major components
Orangeburg and similar soils: About 90 percent

Minor components
- Faceville soils, which are in positions similar to those of the Orangeburg soil or slightly higher and have a clayey subsoil
- Nankin soils, which are in the lower positions, have a clayey subsoil, and have a thinner solum than that of the Orangeburg soil
- Norfolk soils, which are in positions similar to those of the Orangeburg soil or slightly lower and have a yellower subsoil
- Red Bay soils, which are in positions similar to those of the Orangeburg soil and have a dark red subsoil

Characteristics of the Orangeburg Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 1

Typical profile
Surface layer:
0 to 7 inches—dark brown loamy sand
Subsoil:
7 to 11 inches—yellowish red sandy loam
11 to 80 inches—red sandy clay loam

OeB—Orangeburg loamy sand, 2 to 5 percent slopes

Map Unit Composition

Major components
Orangeburg and similar soils: About 85 percent

Minor components
- Faceville soils, which are in positions similar to those of the Orangeburg soil or slightly higher and have a clayey subsoil

- Nankin soils, which are in the lower positions, have a clayey subsoil, and have a thinner solum than that of the Orangeburg soil
- Norfolk soils, which are in positions similar to those of the Orangeburg soil or slightly lower and have a yellower subsoil
- Red Bay soils, which are in positions similar to those of the Orangeburg soil and have a dark red subsoil

Characteristics of the Orangeburg Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2e

Typical profile
Surface layer:
0 to 7 inches—dark brown loamy sand
Subsoil:
7 to 11 inches—yellowish red sandy loam
11 to 80 inches—red sandy clay loam

OgC2—Orangeburg sandy loam, 5 to 8 percent slopes, eroded

Map Unit Composition

Major components
Orangeburg and similar soils: About 85 percent

Minor components
- Cowarts soils, which are in positions similar to those of the Orangeburg soil or lower and have a thinner solum
- Faceville soils, which are in positions similar to those of the Orangeburg soil or slightly higher and have a clayey subsoil
- Nankin soils, which are in the lower positions, have a clayey subsoil, and have a thinner solum than that of the Orangeburg soil
- Norfolk soils, which are in positions similar to those of the Orangeburg soil or slightly lower and have a yellower subsoil
- Red Bay soils, which are in positions similar to those of the Orangeburg soil and have a dark red subsoil

Characteristics of the Orangeburg Soil

Landform: Broad interstream divides
Position on the landform: Shoulders
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate

Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 3e

Typical profile
Surface layer:
0 to 5 inches—dark brown sandy loam
Subsoil:
5 to 11 inches—yellowish red sandy loam
11 to 80 inches—red sandy clay loam

OgD2—Orangeburg sandy loam, 8 to 15 percent slopes, eroded

Map Unit Composition

Major components
Orangeburg and similar soils: About 80 percent

Minor components
- Cowarts soils, which are in positions similar to those of the Orangeburg soil or lower and have a thinner solum
- Faceville soils, which are in positions similar to those of the Orangeburg soil or slightly higher and have a clayey subsoil
- Nankin soils, which are in the lower positions, have a clayey subsoil, and have a thinner solum than that of the Orangeburg soil
- Red Bay soils, which are in positions similar to those of the Orangeburg soil and have a dark red subsoil

Characteristics of the Orangeburg Soil

Landform: Broad interstream divides
Position on the landform: Shoulders
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 4e

Typical profile
Surface layer:
0 to 5 inches—dark brown sandy loam
Subsoil:
5 to 11 inches—yellowish red sandy loam
11 to 80 inches—red sandy clay loam

Pt—Pits

Map Unit Composition

Major components
Pits: About 80 percent

- Nankin soils, which are in the lower positions, have a clayey subsoil, and have a thinner solum than that of the Red Bay soil
- Orangeburg soils, which are in positions similar to those of the Red Bay soil and have a slightly yellower subsoil

Characteristics of the Red Bay Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 1

Typical profile
Surface layer:
0 to 8 inches—dark reddish brown loamy sand
Subsoil:
8 to 40 inches—dark red sandy loam
40 to 80 inches—dark red sandy clay loam

ReB—Red Bay loamy sand, 2 to 5 percent slopes

Map Unit Composition

Major components
Red Bay and similar soils: About 85 percent

Minor components
- Cowarts soils, which are in positions similar to those of the Red Bay soil or slightly lower and have a thinner solum
- Greenville soils, which are in positions similar to those of the Red Bay soil or slightly higher and have a clayey subsoil
- Nankin soils, which are in the lower positions, have a clayey subsoil, and have a thinner solum than that of the Red Bay soil
- Orangeburg soils, which are in positions similar to those of the Red Bay soil and have a slightly yellower subsoil

Characteristics of the Red Bay Soil

Landform: Broad interstream divides
Position on the landform: Summits
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 2e

Typical profile
Surface layer:
0 to 8 inches—dark reddish brown loamy sand

Subsoil:
8 to 40 inches—dark red sandy loam
40 to 80 inches—dark red sandy clay loam

RsC2—Red Bay sandy loam, 5 to 8 percent slopes, eroded

Map Unit Composition

Major components
Red Bay and similar soils: About 85 percent

Minor components
- Cowarts soils, which are in positions similar to those of the Red Bay soil or slightly lower and have a thinner solum
- Greenville soils, which are in positions similar to those of the Red Bay soil or slightly higher and have a clayey subsoil
- Nankin soils, which are in the lower positions, have a clayey subsoil, and have a thinner solum than that of the Red Bay soil
- Orangeburg soils, which are in positions similar to those of the Red Bay soil and have a slightly yellower subsoil

Characteristics of the Red Bay Soil

Landform: Broad interstream divides
Position on the landform: Shoulders
Parent material: Marine deposits
Drainage class: Well drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 3e

Typical profile
Surface layer:
0 to 5 inches—dark reddish brown sandy loam
Subsoil:
5 to 40 inches—dark red sandy loam
40 to 80 inches—dark red sandy clay loam

RsD2—Red Bay sandy loam, 8 to 15 percent slopes, eroded

Map Unit Composition

Major components
Red Bay and similar soils: About 80 percent

Minor components
- Cowarts soils, which are in positions similar to those of the Red Bay soil or slightly lower and have a thinner solum
- Nankin soils, which are in the lower positions, have a clayey subsoil, and have a thinner solum than that of the Red Bay soil
- Orangeburg soils, which are in positions similar to those of the Red Bay soil and have a slightly yellower subsoil

Characteristics of the Red Bay Soil

Landform: Broad interstream divides

Figure 9.—An area of Troup loamy sand, 0 to 5 percent slopes. This soil has very low available water capacity. It is poorly suited to farming but is well suited to most nonfarm uses.

TrD—Troup loamy sand, 5 to 15 percent slopes

Map Unit Composition

Major components

Troup and similar soils: About 80 percent

Minor components
- Lakeland soils, which are in positions similar to those of the Troup soil or slightly higher, are excessively drained, and are sandy throughout
- Lucy soils, which are in positions similar to those of the Troup soil or slightly lower, are well drained, and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches
- Orangeburg soils, which are in positions similar to those of the Troup soil or slightly lower, are well drained, and do not have thick, sandy surface and subsurface layers

Characteristics of the Troup Soil

Landform: Broad interstream divides
Position on the landform: Shoulders
Parent material: Marine deposits
Drainage class: Somewhat excessively drained
Flooding: None
Ponding: None
Permeability: Moderate
Available water capacity: Very low
Depth class: Very deep
Land capability classification: 6s

Typical profile
Surface layer:
0 to 9 inches—weak red loamy sand
Subsurface layer:
9 to 50 inches—strong brown loamy sand
50 to 60 inches—yellowish red loamy sand
Subsoil:
60 to 80 inches—red sandy loam

WhA—Wahee fine sandy loam, 0 to 2 percent slopes, rarely flooded

Map Unit Composition

Major components
Wahee and similar soils: About 70 percent

Minor components
- Kolomoki soils, which are in the higher positions and are well drained
- Chastain soils, which are in the lower positions along f ood plains and drainageways and are poorly drained
- A few areas of soils that are moderately well drained

Characteristics of the Wahee Soil

Landform: River terrace
Parent material: Alluvium
Drainage class: Somewhat poorly drained
Seasonal high water table: Apparent, at a depth of about $^{1}/_{2}$ to $1^{1}/_{2}$ feet
Flooding: Rare
Ponding: None
Permeability: Slow
Available water capacity: Moderate
Depth class: Very deep
Land capability classification: 3w

Typical profile
Surface layer:
0 to 5 inches—gray fne sandy loam
Subsurface layer:
5 to 18 inches—pale brown fne sandy loam
Subsoil:
18 to 24 inches—pale brown sandy clay
24 to 32 inches—grayish brown sandy clay; yellowish brown and red mottles
Substratum:
32 to 72 inches—grayish brown sandy clay; yellowish brown mottles

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as forestland; and as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, campgrounds, and playgrounds.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately suited, poorly suited,* and *unsuited* or as *good, fair,* and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Crops and Pasture

By James M. Dangler, state agronomist, and Jim Napier, district conservationist, Natural Resources Conservation Service

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed, and the system of land capability classification used by the Natural Resources Conservation Service is explained.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Detailed Soil Map Units.” Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Crops

The major management concerns for improving the conservation and productivity of the soils used for crop production in Stewart County are described in this section. Recent trends in crop production are also described.

Soil erosion by water is the main resource concern on much of the cropland in the survey area. The potential for erosion is affected by rainfall, field characteristics, and cropping systems. All of these factors affect the amount of crop residue on the surface of the soil. Crop residue can reduce the extent of erosion. The steepness and length of the slope are two of the field characteristics that affect erosion. The components of a cropping system that have the greatest affect on erosion are the rotation and the intensity and frequency of tillage. The crop and the yield are also important. For example, high-residue crops, such as corn, rye, and wheat, result in less erosion than low-residue crops, such as cotton, peanuts, and most vegetables. The crop yield is important because it is related to the production of above- and below-ground crop residue.

The loss of organic matter to erosion affects the quality and productivity of the soil. Also, a reduction in the depth of the surface layer in a soil that has a loamy or clayey subsoil may result in reduced capacity to till the soil. An example is Orangeburg loamy sand, 5 to 8 percent slopes, eroded, which has a shallow surface layer.

The construction of erosion-control structures may be required to minimize erosion and runoff and increase infiltration of rainfall in some fields. For example, terraces and diversions may be installed on deep, well-drained soils that have regular slopes. Increased crop yields should be obtained as result of the increased content of soil organic matter and water. Outlets for the terraces and diversions are provided by grassed waterways and underground outlets. These structures conduct water from high to low elevations in the field without resulting in significant erosion. Orangeburg loamy sand, 2 to 5 percent slopes, is an example of a soil that is suitable for the construction of terraces. Terraces are not practical on soils that have short or irregular slopes, such as Cowarts-Maubila-Ailey complex, 5 to 15 percent slopes.

During the spring, soil erosion by wind can be a concern on soils that have a sandy surface. Examples of soils that have a sandy surface are Lakeland and Troup soils. Damage to seedlings growing in sandy soil can be reduced by maintaining crop residue or by planting strip crops of rye.

Most of the soils in Stewart County are acidic. Soil reaction is typically very strongly acid or strongly acid throughout. The application of lime, fertilizer, and organic wastes should be based on the results of soil testing, waste analysis, and realistic expectations for crop yields. The Natural Resources Conservation Service and the Cooperative Extension Service can provide information concerning nutrient management plans.

Crop production has decreased in the survey area during the last decade (USDA–NASS, 2007). For example, the acreages used for cotton (5,400 acres) and peanuts (4,000 acres) peaked in the survey area 10 years ago. Since then, these acreages have decreased approximately 100 percent and 50 percent, respectively. The acreage used for winter wheat (2,000 acres) also decreased about 50 percent. Production of rye (2,600 acres) and corn (less than 1,800 acres) has been fairly stable.

Specialty crops, such as vegetables, are produced on small acreages. Most of the well-drained soils in the survey area are also suitable for the production of orchard or nursery crops

Pasture and Hayland

By Dennis Chessman, grazing land specialist, Natural Resources Conservation Service

Most of the grasslands in the county are used for forage production. In addition to providing food for grazing animals, grasslands can offer other beneficial ecosystem services. The fibrous structure of grass roots is effective at holding soil in place, reducing the potential for water erosion. The vegetation functions to intercept raindrops that would otherwise impact the soil surface, dislodging particles and deteriorating soil structure. In addition, soils with a permanent cover of grass have been shown to sequester as much as 2,000 pounds of carbon per acre per year, making grasslands an excellent sink for excess atmospheric carbon dioxide. Warm-season perennial grasses are the primary forages in the county.

Most of the pastures and hay fields in the county are planted to bermudagrass or bahiagrass, both introduced species. Common bermudagrass, as well as several improved varieties, can be seeded. Coastal bermudagrass and other hybrids, however, do not produce enough viable seed for reproduction and therefore must be established vegetatively. Bermudagrass can provide excellent grazing and hay. Bahiagrass is typically used for pasture, although newer, high-yielding varieties have the potential to be used as a productive hay crop. Bahiagrass is slightly less drought-tolerant than bermudagrass, especially on deep, sandy soils, but is highly tolerant of saturated soils. Most varieties of bermudagrass are not adapted to poorly drained conditions.

The county is south of the primary range of tall fescue adaptation. Tall fescue, therefore, is not considered an important forage crop, even though it can occasionally be found on bottomlands and in other sheltered areas that are not regularly grazed.

Native warm-season grasses, such as switchgrass, eastern gamagrass, Indiangrass, and little bluestem are adapted to conditions in the county and able to provide high-quality spring grazing. These species, however, are not widely used for forage production. Unlike the introduced forage grasses, which are relatively tolerant of continuous grazing, the native warm-season grasses must be rotationally stocked and minimum grazing heights must be rigorously maintained in order to prevent stand loss. In addition, they will not produce as much hay as bermudagrass.

Competition from weeds can be a problem in fields where thinning of the stand or death of the forage has allowed undesirable plants to become established. Management- and environment-related factors that can contribute to poor forage growth and to favorable conditions for weeds include decreased soil fertility, low soil pH, improper grazing or harvest management, and extended drought. All but the last factor can be controlled. Selective use of herbicides may be necessary if undesirable plants become established and reach threshold population levels.

Most of the soils in the county are highly weathered and naturally acidic. Applying fertilizer and lime on the basis of periodic soil testing with consideration for yield goals helps to ensure vigorous forage growth. The efficiency of fertilizer can be improved by applying limestone to soils with pH below 6.0. If other environmental conditions for growth are favorable, yields of bahiagrass and bermudagrass can be significantly increased by applying nitrogen fertilizer. Hybrid bermudagrass varieties in particular are highly responsive to applications of fertilizer. The yield potential is at least 8 to 10 tons per acre if nitrogen is supplied throughout the growing season and soil moisture is not limiting. Low levels of potassium in the soil can result in increased susceptibility by bermudagrass to environmental stresses, such as cold, drought, and over-grazing. Such stresses can lead to stand decline or loss, especially if improved varieties are managed for maximum yields of hay.

Proper forage harvest management includes maintaining a minimum after-harvest height and allowing adequate time for regrowth before the plants are mowed or grazed again. Excessive stocking rates can result in plants being grazed too close to the ground and being regrazed before they have enough time to recover from previous harvesting. Bermudagrass and bahiagrass should not be harvested to a height of less than 2 inches. Although these species are relatively tolerant of the low and frequent grazing that is typically associated with continuous stocking, they perform better if stock density is adjusted as forage growth changes throughout the season. Native grasses are much less tolerant of close and frequent harvesting. Generally, they should not be grazed to a height of less than 6 to 8 inches, depending on species. Recovery time after grazing is longer for the native grasses than for the non-native species. Rotational stocking with several paddocks is essential for the maintenance of vigorous, long-term, native warm-season grass pasture. The time necessary for regrowth of any species depends primarily on soil moisture, fertility, soil temperature, and harvest height.

An important but somewhat underutilized practice on the Coastal Plain is the establishment of winter pasture by over-seeding dormant, warm-season perennial grass with cool-season annuals in the fall. Benefits of winter pasture include reduced expenses for hay and improved forage nutritive value compared to warm-season grasses. Commonly used winter pasture species include rye, oats, wheat, annual ryegrass, and clovers, such as crimson clover and arrowleaf clover. Livestock producers should give serious consideration to including clovers or other legumes in their forage system. Legumes are typically high in crude protein and improve the overall nutritive value of the winter pasture. The bacteria living in association with legume roots provide nitrogen for the plants, thus reducing or eliminating the need for nitrogen fertilizer. Alfalfa is a perennial legume that provides excellent forage. Alfalfa can be grown in the county on well drained soils in which the surface pH can be maintained close to 7.0 and the subsoil pH is 5.5 or higher to a depth of about 4 feet. Although the nutritive value of alfalfa can be excellent, it is adapted to fewer sites and requires more management than other forages commonly grown on the Coastal Plain.

Yields per Acre

The average yields per acre shown in tables 5 and 6 are those that can be expected of the principal crops under a high level of management. In any given year, yields may be higher or lower than those indicated in the tables because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the tables.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

Pasture yields are expressed in terms of animal unit months. An animal unit month (AUM) is the amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the yields tables are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA, 1961).

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, 2e-4 and 3e-6. These units are not given in this soil survey.

The capability classification of the soils in this survey area is given in the section “Detailed Soil Map Units” and in the yields tables.

Prime Farmland and Farmland of Statewide Importance

Table 7 lists the map units in the survey area that are considered prime farmland and farmland of statewide importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation’s food supply.

Prime farmland is of major importance in meeting the Nation’s short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation’s prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses (fig. 10). It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

In some areas, land that does not meet the criteria for prime farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime

Figure 10.—A well managed field of no-till soybeans in an area of Orangeburg loamy sand, 0 to 2 percent slopes. This soil is prime farmland. It is well suited to agricultural and nonagricultural uses.

farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

Hydric Soils

In this section, hydric soils are defned and described and the hydric soils in the survey area are listed. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specifc site (National Research Council, 1995; Hurt and Vasilas, 2006).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identifed as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defned by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, fooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS defnition identifes general soil properties that are associated with wetness. In order to determine whether a specifc soil is a hydric soil or nonhydric soil, however, more specifc information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in “Soil Taxonomy” (Soil Survey Staff, 1999), “Keys to Soil Taxonomy” (Soil Survey Staff, 2006), and the “Soil Survey Manual” (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in “Field Indicators of Hydric Soils in the United States” (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2B3). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   - A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
   - B. are poorly drained or very poorly drained and have either:
     - 1) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
     - 2) a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
     - 3) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for long or very long duration during the growing season.
4. Soils that are frequently flooded for long or very long duration during the growing season.

The following map units meet the definition of hydric soils and, in addition, have at least one of the hydric soil indicators. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 1998).

ChA Chastain loam, 0 to 2 percent slopes, occasionally flooded
GrA Grady clay loam, ponded
KBA Kinston and Bibb soils, 0 to 1 percent slopes, frequently flooded
OBB Ochlockonee, Iuka, and Bibb soils, 0 to 5 percent slopes, frequently flooded
RaA Rains sandy loam, 0 to 2 percent slopes, occasionally flooded

Map units that are made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The following map units, in general, do not meet the definition of hydric soils because they do not have one of the hydric soil indicators. A portion of these map units, however, may include hydric soils. Onsite investigation is recommended to determine whether hydric soils occur and the location of the included hydric soils.

GoA Goldsboro loamy sand, 0 to 2 percent slopes
OcA Ocilla loamy sand, 0 to 2 percent slopes
WhA Wahee fine sandy loam, 0 to 2 percent slopes, rarely flooded

Forestland Productivity and Management

By Keith Wooster, state biologist, Natural Resources Conservation Service

Of the more than 296,500 acres in Stewart County, over 82 percent, or 240,664 acres, is forestland. About 235,000 acres, or 98 percent, of the forestland is privately owned. The remainder is owned by the state government.

The most significant forest types in the county include mixed oak-hickory (about 64,000 acres), loblolly-shortleaf pine (about 129,550 acres), oak-pine (about 29,700 acres), and oak-gum-cypress (about 18,800 acres). About 1,450 acres is considered nonstocked.

Virgin forest once covered most of Stewart County. As settlement progressed in the area, the upland, well-drained soils were cleared for cultivation. The soils in the remaining forestland consisted of moderately well drained to poorly drained soils along streams, in wetlands, on flood plains, in depressions, and on broad, low-lying uplands and deep, excessively drained soils on ridges, uplands, and stream terraces.

The total acreage of forestland decreased slightly, by less than 5 percent, from 1989 to 2007. The distribution of the forest types, however, changed significantly during that time. The extent of loblolly pine increased by more than 32,489 acres (26 percent); oak-gum-cypress increased by 10,250 acres; mixed oak-pine increased by almost 5,470 acres (17 percent); oak-hickory decreased by over 72,000 acres (90 percent), and shortleaf pine and slash pine decreased by 38,150 acres. These changes over time represent a slight increase in the acreage of pine and a substantial decrease in the acreage of oak-hickory.

Current distribution by age for pines includes 47 percent under 10 years old and only 1 percent over 30 years old. Pine and hardwoods together include 46 percent under 10 years old and 20 percent over 30 years old.

Forest production has shifted from sawtimber to pulpwood over the last 10 years. Production of sawtimber decreased 30 percent while production of pulpwood increased 40 percent for pines and 21 percent for hardwoods.

About 82 percent of the forestland in Stewart County is considered fully stocked or medium stocked. The remainder is poorly stocked. Only about 10 percent of the forestland is considered moderately productive, capable of producing about 1 to 1.75 cords per acre per year under average management. Much of the remaining acreage normally produces less than 1 cord per acre per year. Production on much of the existing forestland could be improved by thinning out mature trees and undesirable species and by controlling fire, disease, and insects (fig. 11). The Natural Resources Conservation Service, the Georgia Forestry Commission, and the Cooperative Extension Service can help determine specific forestland management needs.

The tables in this survey can help forest owners or managers plan the use of soils for wood crops. They show the potential productivity of the soils for wood crops and rate the soils according to the limitations that affect various aspects of forestland management.

Figure 11.—A well managed stand of longleaf pine in an area of Lucy loamy sand, 0 to 5 percent slope.

Forestland Productivity

In table 8, the *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years (50 in this survey). The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the “National Forestry Manual,” which is available in local offices of the Natural Resources Conservation Service and on the Internet.

The *volume of wood fiber*, a number, is the yield likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

Trees to manage are those that are preferred for planting, seeding, or natural regeneration and those that remain in the stand after thinning or partial harvest.

Forestland Management

In tables 9a through 9c, interpretive ratings are given for various aspects of forestland management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified aspect of forestland management. *Well suited* indicates that the soil has features that are favorable for the specified management aspect and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified management aspect. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified management aspect. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified management aspect or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified aspect of forestland management (1.00) and the point at which the soil feature is not a limitation (0.00).

The paragraphs that follow indicate the soil properties considered in rating the soils. More detailed information about the criteria used in the ratings is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service and on the Internet.

Table 9a

The ratings of *suitability for log landings* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The soils are described as well suited, moderately suited, or poorly suited to use as log landings.

Ratings in the column *hazard of erosion on roads and trails* are based on the soil erodibility factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and *severe* indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

Table 9b

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Table 9c

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope.

Rating class terms for seedling mortality are expressed as *low, moderate,* and *high*. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for seedling mortality is highest (1.00) and the point at which the potential is lowest (0.00).

Ratings in the column *suitability for use of harvesting equipment* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classifcation, depth to a water table, and ponding. The soils are described as well suited, moderately suited, or poorly suited to this use.

Recreational Development

In tables 10a and 10b, the soils of the survey area are rated according to limitations that affect their suitability for recreational development (fig. 12). The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specifed use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specifed use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specifed use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to fooding is considered.

Figure 12.—A recreational site in an area of Bonneau loamy sand, 0 to 5 percent slopes. Although the soil is sandy to a depth of 20 to 40 inches, which limits some uses, it is serviceable as a site for camping and picnicking.

Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effuent and the ability of the soil to support vegetation also are important. Soils that are subject to fooding are limited for recreational uses by the duration and intensity of fooding and the season when fooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of fooding is essential.

The information in these tables can be supplemented by other information in this survey, for example, interpretations for dwellings without basements, for local roads and streets, and for septic tank absorption felds.

Table 10a

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffc and some vehicular traffc. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that infuence traffcability and promote the growth of vegetation, especially in heavily used areas. For good traffcability, the surface of camp areas should absorb rainfall readily, remain frm under heavy foot traffc, and not be dusty when dry. The soil properties that infuence traffcability are texture of the surface layer, depth to a water table, ponding, fooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffc. Most vehicular traffc is confned to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that infuence traffcability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good traffcability, the surface of picnic areas should absorb rainfall readily, remain frm under heavy foot traffc, and not be dusty when dry. The soil properties that infuence traffcability are texture of the surface layer, depth to a water table, ponding, fooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Table 10b

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffc. The ratings are based on the soil properties that affect the ease of developing playgrounds and that infuence traffcability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good traffcability, the surface of the playgrounds should absorb rainfall readily, remain frm under heavy foot traffc, and not be dusty when dry. The soil properties that infuence traffcability are texture of the surface layer, depth to a water table, ponding, fooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modifcation through cutting and flling. The ratings are based on the soil properties that affect traffcability and erodibility. These properties are stoniness, depth to a water table, ponding, fooding, slope, and texture of the surface layer.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the data in the tables described under the heading “Soil Properties.”

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for septic tank absorption fields and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of sand, roadfill, and topsoil; plan structures for water management; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Tables 11a and 11b show the degree and kind of soil limitations that affect dwellings with and without basements, local roads and streets, and shallow excavations.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected.

Somewhat limited indicates that the soil has features that are moderately favorable for the specifed use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specifed use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Table 11a

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, fooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unifed classifcation. The properties that affect the ease and amount of excavation include depth to a water table, ponding, fooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Table 11b

Local roads and streets have an all-weather surface and carry automobile and light truck traffc all year. They have a subgrade of cut or fll soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of fexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffc-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, fooding, the amount of large stones, and slope. The properties that affect the traffc-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that infuence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers infuence the ease of digging, flling, and compacting. Depth to the seasonal high water table, fooding, and ponding may restrict the period when excavations can be made. Slope infuences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) infuence the resistance to sloughing.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption felds and sewage lagoons. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

Construction Materials

Table 13 gives information about the soils as potential sources of sand, roadfill, and topsoil. Normal compaction, minor processing, and other standard construction practices are assumed.

Sand is a natural aggregate suitable for commercial use with a minimum of processing. Sand is used in many kinds of construction. Specifications for each use vary widely. In the table, only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand, the soil is considered a likely source regardless of thickness. The assumption is that the sand layer below the depth of observation exceeds the minimum thickness.

The soils are rated *good, fair,* or *poor* as potential sources of sand. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand. The number 0.00 indicates that the layer is a poor source. The number 1.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

The soils are rated *good, fair,* or *poor* as potential sources of roadfill and topsoil. The features that limit the soils as sources are specified in the table. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources. The lower the number, the greater the limitation.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and that are moderately favorable for the specifed use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specifed use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overfow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fll. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects traffcability.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering properties, physical and chemical properties, and pertinent soil and water features.

Engineering Properties

Table 15 gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Soil Features

Table 16 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Water Features

Table 17 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. The table indicates, by month, depth to the top (*upper limit*) of the saturated zone in most years. Estimates of the upper limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of fooding and the relation of each soil on the landscape to historic foods. Information on the extent of fooding based on soil data is less specifc than that provided by detailed engineering surveys that delineate food-prone areas at specifc food frequency levels.

Physical and Chemical Properties

Table 18 shows estimates of some physical and chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on feld observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specifc effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classifcation.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They infuence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at feld moisture capacity, that is, the moisture content at $^{1}/_{3}$- or $^{1}/_{10}$-bar (33- or 10-kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is infuenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (Ksat) refers to the ability of a soil to transmit water or air. The term “permeability,” as used in soil surveys, indicates saturated hydraulic conductivity (Ksat). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the feld, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption felds.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfned clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar (33- or 10-kPa) moisture tension and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2006). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Kandiudult (*Kandi*, meaning an apparent cation-exchange capacity of 16 centimoles of positive charge or less per kilogram of clay and an apparent effective cation-exchange capacity of 12 centimoles of positive charge or less per kilogram of clay, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Kandiudults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, kaolinitic, thermic Typic Kandiudults.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example is the Benevolence series.

Table 19 indicates the order, suborder, great group, subgroup, and family of the soil series in the survey area.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (Soil Survey Division Staff, 1993) and in the “Field Book for Describing and Sampling Soils” (Schoeneberger and others, 2002). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff, 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff, 2006). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

In some instances, the typical pedon for a series is located outside the survey area. The selection of a typical pedon is based on the range of characteristics of the series as it occurs throughout a particular major land resource area. The Ailey series, for example, is common in MLRA 133A (Southern Coastal Plain), which extends from Virginia to eastern Mississippi. The typical pedon described in this section for the Ailey series is in Randolph County, Georgia.

Ailey Series

Landform: Interfluves
Parent material: Loamy marine deposits
Drainage class: Well drained
Permeability class: Slow
Depth class: Very deep
Slope: 2 to 25 percent
Taxonomic classification: Loamy, kaolinitic, thermic Arenic Kanhapludults

Geographically Associated Soils

Blanton, Cowarts, Lakeland, Maubila, Nankin, and Troup soils are commonly associated with the Ailey series.

- The Blanton soils are in positions similar to those of the Ailey soils or slightly higher and have surface and subsurface layers with a combined thickness of 40 to 80 inches.
- The Cowarts soils are in positions similar to those of the Ailey soils; do not have thick, sandy surface and subsurface layers; and have a solum that ranges from 20 to 40 inches in thickness.
- The Lakeland soils are in the slightly higher positions, are excessively drained, and are sandy throughout.
- The Maubila soils are in positions similar to those of Ailey soils, are moderately well drained, and have a fine control section.
- The Nankin soils are in positions similar to those of the Ailey soils or slightly lower; do not have thick, sandy surface and subsurface layers; and have a fine control section.
- The Troup soils are in the slightly higher positions, are somewhat excessively drained, and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches.

Typical Pedon

Ailey loamy sand, 5 to 8 percent slopes; about 2,500 feet north of County Road 152, on a side slope adjacent to Collins Mill Creek; Randolph County, Georgia; Brooksville, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 51 minutes 2 seconds N. and long. 84 degrees 41 minutes 55 seconds W.

Ap—0 to 3 inches; brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; 5 percent angular ironstone; moderately acid; abrupt wavy boundary.

E1—3 to 14 inches; light yellowish brown (10YR 6/4) loamy sand; weak coarse subangular blocky structure; very friable; 5 percent angular ironstone; moderately acid; gradual wavy boundary.

E2—14 to 23 inches; yellowish brown (10YR 5/6) loamy sand; weak coarse subangular blocky structure; very friable; 5 percent angular ironstone; strongly acid; gradual wavy boundary.

Bt1—23 to 30 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; friable; 12 percent angular ironstone; strongly acid; gradual wavy boundary.

Bt2—30 to 42 inches; strong brown (7.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; 12 percent angular ironstone; strongly acid; gradual wavy boundary.

Btx—42 to 47 inches; strong brown (7.5YR 5/6) sandy clay loam; 80 percent moderate medium subangular blocky structure and 20 percent red (2.5YR 5/6) strong thick platy structure; firm; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

2Cd—47 to 80 inches; strong brown (7.5YR 5/6) clay loam; platy; common medium distinct light gray (10YR 7/1) iron depletions and many medium distinct red (2.5YR 5/6) and pale brown (10YR 6/3) masses of iron accumulation; strongly acid.

Range in Characteristics

Thickness of the solum: 42 to 60 inches

Thickness of the sandy epipedon: 20 to 40 inches

Reaction: Very strongly acid or strongly acid throughout, except where the surface layer has been limed

A or Ap horizon:

Color—hue of 10YR, value of 3 to 5, and chroma of 2 or 3

Texture—loamy sand or sand

E horizon:

Color—hue of 10YR, value of 5 or 6, and chroma of 4 to 6

Texture—loamy sand or sand

BE horizon (where present):

Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8

Texture—loamy sand or sandy loam

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8

Texture—sandy loam or sandy clay loam

Redoximorphic features—no, few, or common masses of iron accumulation in shades of brown and red

Btx horizon:

Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8; or no dominant color and multicolored in shades of red, yellow, brown, and gray

Texture—sandy clay loam

Redoximorphic features—iron depletions in shades of gray and masses of iron accumulation in shades of brown, red, and yellow in some pedons

Other features—brittle and hard bodies, commonly red, make up 10 to 40 percent, by volume, of the horizon.

Cd or 2Cd horizon:

Color—hue of 5YR to 10YR, value of 4 to 7, and chroma of 4 to 8; or no dominant color and multicolored in shades of red, yellow, brown, and gray

Texture—sandy loam, sandy clay loam, or clay loam
Redoximorphic features—iron depletions in shades of gray and masses of iron accumulation in shades of red, brown, or yellow

Benevolence Series

Landform: Broad interstream divides
Parent material: Loamy marine deposits
Drainage class: Well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 8 percent
Taxonomic classification: Coarse-loamy, kaolinitic, thermic Typic Kandiudults

Geographically Associated Soils

Lakeland, Lucy, Orangeburg, Red Bay, and Troup soils are commonly associated with the Benevolence series.

- The Lakeland soils are in the higher positions, are excessively drained, and are sandy throughout.
- The Lucy soils are in positions similar to those of the Benevolence soils and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches.
- The Orangeburg soils are in positions similar to those of the Benevolence soils and have a fne-loamy control section.
- The Red Bay soils are in positions similar to those of the Benevolence soils or
- slightly higher, have w

E horizon (where present):
Color—hue of 10YR, value of 5 or 6, and chroma of 4
Texture—loamy fine sand or loamy sand

EB horizon (where present):
Color—hue of 7.5YR, value of 5 or 6, and chroma of 5 or 6
Texture—loamy fine sand or loamy sand

BE horizon (where present):
Color—hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8
Texture—sandy loam

Bt horizon:
Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8
Texture—fine sandy loam or sandy loam in the upper part; sandy loam or sandy clay loam in the lower part

Bibb Series

Landform: Flood plains
Parent material: Loamy and sandy alluvium
Drainage class: Poorly drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 2 percent
Taxonomic classification: Coarse-loamy, siliceous, active, acid, thermic Typic Fluvaquents

Geographically Associated Soils

Iuka, Kinston, and Ochlockonee soils are commonly associated with the Bibb series.

- The Iuka soils are in the higher positions on the flood plains and are moderately well drained.
- The Kinston soils are in positions similar to those of the Bibb soils and have a fine-loamy control section.
- The Ochlockonee soils are in the higher positions on the flood plains and are well drained.

Typical Pedon

Bibb fine sandy loam in an area of Kinston and Bibb soils, 0 to 1 percent slopes, frequently flooded; about 3,800 feet west of the Randolph and Terrell County line on County Road 155 and 300 feet north in the Ichawaynochaway Creek flood plain; Randolph County, Georgia; Parrott, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 54 minutes 3 seconds N. and long. 84 degrees 36 minutes 48 seconds W.

A—0 to 5 inches; very dark gray (10YR 3/1) fine sandy loam; weak fine granular structure; very friable; common fine, common medium, and common coarse roots; strongly acid; clear wavy boundary.
Cg1—5 to 8 inches; dark gray (10YR 4/1) loam; massive; very friable; common fine, common medium, and common coarse roots; few fine distinct strong brown (7.5YR 5/6) masses of iron accumulation; strongly acid; clear wavy boundary.
Cg2—8 to 13 inches; dark gray (10YR 4/1) sandy loam; massive; friable; common coarse, few fine, and few medium roots; common medium distinct strong brown (7.5YR 5/6) masses of iron accumulation; strongly acid; clear wavy boundary.
Cg3—13 to 21 inches; light brownish gray (10YR 6/2) sandy loam; massive; friable; common coarse and few medium roots; common medium distinct pale brown

(10YR 6/3), brownish yellow (10YR 6/6), and light yellowish brown (10YR 6/4) masses of iron accumulation; strongly acid; clear wavy boundary.
Cg4—21 to 27 inches; gray (10YR 5/1) sandy loam; massive; friable; few coarse roots; common medium distinct light yellowish brown (10YR 6/4) masses of iron accumulation; very strongly acid; clear wavy boundary.
Ab—27 to 45 inches; very dark gray (10YR 3/1) sandy loam; massive; frm; very strongly acid; clear wavy boundary.
C′g1—45 to 63 inches; very dark gray (10YR 3/1) and light brownish gray (10YR 6/2) stratifed sand to sandy loam; massive; friable; very strongly acid; clear wavy boundary.
C′g2—63 to 80 inches; dark gray (10YR 4/1) loamy sand; massive; very friable; very strongly acid.

Range in Characteristics

Reaction: Very strongly acid or strongly acid throughout, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 1 to 3
Texture—loamy sand, loamy fne sand, sandy loam, fne sandy loam, or silt loam
Redoximorphic features—no, few, or common iron depletions in shades of gray and masses of iron accumulation in shades of brown

Ag or Ab horizon (where present):
Color—hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 2 or less; or neutral in hue and value of 3 to 7
Texture—loamy sand, loamy fne sand, sandy loam, fne sandy loam, or silt loam
Redoximorphic features—no, few, or common masses of iron accumulation in shades of yellow and brown

Cg abd C'g horizons:
Color—hue of 10YR to 5BG, value of 3 to 7, and chroma of 1 or 2; or neutral in hue and value of 3 to 7
Texture—upper part: sandy loam, fne sandy loam, or loam or stratifed in these textures; lower part: sand, loamy sand, loamy fne sand, sandy loam, fne sandy loam, or loam or stratifed in these textures
Redoximorphic features—few or common iron depletions in shades of gray and masses of iron accumulation in shades of brown, yellow, and red

Blanton Series

Landform: Interfuves
Parent material: Sandy and loamy marine deposits
Drainage class: Well drained
Permeability class: Moderately slow
Depth class: Very deep
Slope: 0 to 8 percent
Taxonomic classification: Loamy, siliceous, semiactive, thermic Grossarenic Paleudults

Geographically Associated Soils

Ailey, Bonneau, Lakeland, Norfolk, and Troup soils are commonly associated with the Blanton series.

- The Ailey soils are in positions similar to those of the Blanton soils or slightly lower and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches over a dense, brittle subsoil.

- The Bonneau soils are in positions similar to those of the Blanton soils or slightly lower and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches.
- The Lakeland soils are in the higher positions, are excessively drained, and are sandy throughout.
- The Norfolk soils are in positions similar to those of the Blanton soils or slightly lower and do not have thick, sandy surface and subsurface layers.
- The Troup soils are in slightly higher positions than those of the Blanton soils and have a redder subsoil.

Typical Pedon

Blanton loamy sand, 5 to 8 percent slopes; about 1.7 miles east of Omaha on Georgia Highway 39 and 100 feet north of the road; Stewart County, Georgia; Sanford, Georgia, USGS 7.5-minute quadrangle; lat. 32 degrees 8 minutes 23 seconds N. and long. 84 degrees 57 minutes 55 seconds W.

Ap—0 to 3 inches; light brownish gray (10YR 6/2) loamy sand; weak fine granular structure; strongly acid; clear wavy boundary.
E1—3 to 18 inches; yellow (10YR 7/6) loamy sand; weak fine granular structure; strongly acid; gradual smooth boundary.
E2—18 to 48 inches; brownish yellow (10YR 6/6) loamy sand; weak fine granular structure; very strongly acid; clear wavy boundary.
Bt1—48 to 54 inches; strong brown (7.5YR 5/6) sandy loam; moderate medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.
Bt2—54 to 58 inches; light yellowish brown (10YR 6/4) sandy loam; moderate medium subangular blocky structure; friable; common coarse prominent yellowish red (5YR 5/6) masses of iron accumulation; very strongly acid; gradual wavy boundary.
Bt3—58 to 72 inches; light yellowish brown (10YR 6/4) sandy loam; weak medium subangular blocky structure; friable; common coarse prominent light gray (2.5Y 7/1) iron depletions; very strongly acid.

Range in Characteristics

Thickness of the solum: 60 to more than 80 inches
Thickness of the sandy epipedon: 40 to 80 inches
Reaction: Very strongly acid to moderately acid throughout, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 10YR, value of 3 to 7, and chroma of 1 to 4
Texture—loamy sand

E horizon:
Color—hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 1 to 8
Texture—loamy sand

BE horizon (where present):
Color—hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8
Texture—loamy sand or sandy loam

Bt horizon:
Color—hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8; or no dominant color and multicolored in shades of brown, yellow, red, and gray
Texture—sandy loam or sandy clay loam
Redoximorphic features—no, few, or common masses of iron accumulation in shades of brown, red, and yellow and iron depletions in shades of gray

Btg horizon (where present):
Color—hue of 7.5YR to 5Y, value of 5 to 8, and chroma of 1 or 2

Texture—dominantly sandy loam or sandy clay loam; ranging to sandy clay below a depth of about 60 inches
Redoximorphic features—common or many masses of iron accumulation in shades of brown, yellow, and red

Bonneau Series

Landform: Interfluves
Parent material: Loamy marine deposits
Drainage class: Well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 8 percent
Taxonomic classification: Loamy, siliceous, subactive, thermic Arenic Paleudults

Geographically Associated Soils

Blanton, Cowarts, Norfolk, Orangeburg, and Troup soils are commonly associated with the Bonneau series.

- The Blanton soils are in positions similar to those of the Bonneau soils or slightly higher and have surface and subsurface layers with a combined thickness of 40 to 80 inches.
- The Cowarts soils are in positions similar to those of the Bonneau soils, have a solum that ranges from 20 to 40 inches in thickness, and do not have the thick, sandy surface and subsurface horizons.
- The Norfolk and Orangeburg soils are in positions similar to those of the Bonneau soils and do not have thick, sandy surface and subsurface horizons.
- The Troup soils are in the slightly higher positions, are somewhat excessively drained, and have sandy surface and subsurface horizons with a combined thickness of 40 to 80 inches.

Typical Pedon

Bonneau loamy sand, 0 to 5 percent slopes; about 0.6 mile northwest of Springvale on County Road 31 and 40 feet west of the road; Randolph County, Georgia; Morris, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 50 minutes 8 seconds N. and long. 84 degrees 53 minutes 43 seconds W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; common fine, common medium, and few coarse roots; slightly acid; abrupt wavy boundary.
E1—6 to 12 inches; light yellowish brown (10YR 6/4) loamy sand; weak fine granular structure; very friable; common fine and common medium roots; slightly acid; gradual wavy boundary.
E2—12 to 22 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; common fine and common medium roots; moderately acid; gradual wavy boundary.
E3—22 to 33 inches; yellowish brown (10YR 5/6) loamy sand; weak fine granular structure; very friable; common fine and common medium roots; moderately acid; gradual wavy boundary.
Bt1—33 to 52 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; common fine and common medium roots; 3 percent ironstone nodules; moderately acid; gradual wavy boundary.
Bt2—52 to 65 inches; light yellowish brown (10YR 6/4) sandy loam; moderate medium subangular blocky structure; friable; few fine and few medium roots; common medium very distinct pale brown (10YR 7/3) iron depletions and common medium

distinct yellowish brown (10YR 5/6) masses of iron accumulation; 3 percent ironstone nodules; moderately acid; gradual wavy boundary.

BC—65 to 72 inches; light yellowish brown (10YR 6/4) sandy clay; weak medium subangular blocky structure; friable; light gray (5Y 7/2) iron depletions and brownish yellow (10YR 6/6) masses of iron accumulation; moderately acid.

Range in Characteristics

Thickness of the solum: 60 to more than 80 inches
Thickness of the sandy epipedon: 20 to 40 inches
Reaction: Very strongly acid to moderately acid throughout, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 10YR, value of 3 to 5, and chroma of 2 to 4
Texture—loamy sand

E horizon:
Color—hue of 10YR, value of 4 to 6, and chroma of 4 to 6
Texture—loamy sand

Bt horizon, upper part:
Color—hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 6 to 8
Texture—sandy loam or sandy clay loam

Bt horizon, lower part:
Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 8; or multicolored in shades of red, brown, yellow, or gray
Texture—sandy loam, sandy clay loam, or sandy clay
Redoximorphic features—no, few, or common masses of iron accumulation in shades of brown, red, and yellow and iron depletions in shades of gray within a depth of 60 inches

BC horizon:
Color—hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8; or multicolored in shades of red, brown, yellow, or gray
Texture—sandy loam, sandy clay loam, or sandy clay
Redoximorphic features—few, common, or many iron depletions in shades of gray and masses of iron accumulation in shades of red and brown

Chastain Series

Landform: Flood plains
Parent material: Clayey alluvium
Drainage class: Poorly drained
Permeability class: Slow
Depth class: Very deep
Slope: 0 to 2 percent
Taxonomic classification: Fine, mixed, semiactive, acid, thermic Fluvaquentic Endoaquepts

Geographically Associated Soils

Iuka, Kolomoki, Ochlockonee, Rains, and Wahee soils are commonly associated with the Chastain series.

- The Iuka soils are in the higher positions on food plains, are moderately well drained, and have a coarse-loamy control section.
- The Kolomoki soils are in the higher positions on uplands and are well drained.

- The Ochlockonee soils are in the higher positions on uplands, are well drained, and have a coarse-loamy control section.
- The Rains soils are in positions similar to those of the Chastain soils or slightly higher and have a fine-loamy control section.
- The Wahee soils are in the slightly higher positions on uplands and are somewhat poorly drained.

Typical Pedon

Chastain loam, 0 to 2 percent slopes, occasionally flooded; about 0.9 mile north of the Stewart and Quitman County line on Georgia Highway 39, west 0.5 mile on a dirt road into the Eufaula National Wildlife Refuge, and north 0.6 mile; Stewart County, Georgia; Twin Springs, Alabama, USGS 7.5-minute quadrangle; lat. 32 degrees 0 minutes 8 seconds N. and long. 85 degrees 2 minutes 55 seconds W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam; weak fine granular structure; very friable; strongly acid; clear smooth boundary.

Bg1—4 to 8 inches; dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) clay loam; weak fine granular structure; very friable; many fine prominent strong brown (7.5YR 5/6) masses of iron accumulation; strongly acid; gradual wavy boundary.

Bg2—8 to 18 inches; dark grayish brown (10YR 4/2) clay; moderate medium subangular blocky structure; firm; many coarse prominent strong brown (7.5YR 5/6) masses of iron accumulation and few medium distinct gray (2.5Y 5/1) iron depletions; strongly acid; gradual wavy boundary.

Bg3—18 to 32 inches; 40 percent brown (10YR 5/3), 30 percent yellowish red (5YR 5/8), 20 percent dark gray (5Y 4/1), and 10 percent dark grayish brown (10YR 4/2) clay; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; strongly acid; areas of brown and yellowish red are masses of iron accumulation and areas of dark gray and dark grayish brown are iron depletions; gradual wavy boundary.

Bg4—32 to 72 inches; gray (5Y 6/1) clay; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; common medium prominent brownish yellow (10YR 6/6) masses of iron accumulation; strongly acid.

Range in Characteristics

Thickness of the solum: More than 80 inches

Reaction: Very strongly acid or strongly acid to a depth of 40 inches, except where the surface layer has been limed; very strongly acid to moderately acid below a depth of 40 inches

A or Ap horizon:

Color—hue of 7.5YR to 5Y, value of 2 to 6, chroma of 1 to 6; or neutral in hue and value of 4 to 7

Texture—loam

Redoximorphic features—no, few, or common masses of iron accumulation in shades of red, yellow, or brown and iron depletions in shades of brown, yellow, olive, or gray

Bg horizon:

Color—hue of 10YR to 5GY, value of 4 to 7, and chroma of 1 or 2; or neutral in hue and value of 4 to 7

Texture—clay loam or clay

Redoximorphic features—no, few, or common masses of iron accumulation in shades of red, yellow, or brown and iron depletions in shades of brown, yellow, olive, or gray

BCg horizon (where present):

Color—hue of 10YR to 5GY, value of 4 to 7, and chroma of 1 or 2; or neutral in hue and value of 4 to 7

Texture—clay loam or clay
Redoximorphic features—no, few, or common masses of iron accumulation in shades of red, yellow, or brown and iron depletions in shades of brown, yellow, olive, or gray

Cg horizon (where present):
Color—hue of 10YR to 5GY, value of 4 to 7, and chroma of 1 or 2; or neutral in hue and value of 4 to 7
Texture—sandy clay loam, clay loam, or clay
Redoximorphic features—no, few, or common masses of iron accumulation in shades of red, yellow, or brown and iron depletions in shades of brown, yellow, olive, or gray

2Cg horizon (where present):
Color—hue of 10YR to 5GY, value of 4 to 7, and chroma of 1 or 2; or neutral in hue and value of 4 to 7
Texture—variable, ranging from sandy to clayey
Redoximorphic features—no, few, or common masses of iron accumulation in shades of red, yellow, or brown and iron depletions in shades of brown, yellow, olive, or gray

Cowarts Series

Landform: Hillslopes and interfluves
Parent material: Loamy marine deposits
Drainage class: Well drained
Permeability class: Slow
Depth class: Very deep
Slope: 2 to 25 percent
Taxonomic classification: Fine-loamy, kaolinitic, thermic Typic Kanhapludults

Geographically Associated Soils

Ailey, Bonneau, Lucy, Maubila, Nankin, and Troup soils are commonly associated with the Cowarts series.

- The Ailey soils are in positions similar to those of the Cowarts soils and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches over dense, brittle layers.
- The Bonneau soils are in positions similar to those of the Cowarts soils and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches.
- The Lucy soils are in positions similar to those of the Cowarts soils or slightly higher and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches.
- The Maubila soils are in positions similar to those of the Cowarts soils or higher, are moderately well drained, and have a fine control section.
- The Nankin soils are in positions similar to those of the Cowarts soils, have a solum that is less than 60 inches thick, and have a fine control section.
- The Troup soils are in the higher positions, are somewhat excessively drained, and have surface and subsurface layers with a combined thickness of 40 to 80 inches.

Typical Pedon

Cowarts loamy sand in an area of Nankin-Cowarts complex, 15 to 35 percent slopes; about 0.6 mile north of Sharon Church, 2,960 feet south of the Stewart County line, and 3,200 feet west of County Road 28; Randolph County, Georgia; Sanford, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 54 minutes 58 seconds N. and long. 84 degrees 53 minutes 30 seconds W.

Ap1—0 to 3 inches; dark grayish brown (10YR 4/2) loamy sand; weak fne granular

Texture—loamy sand, sandy loam, or sandy clay loam or stratifed in these textures
Redoximorphic features—few, common, or many iron depletions in shades of gray and masses of iron accumulation in shades of red, brown, and yellow

Faceville Series

Landform: Broad interstream divides
Parent material: Clayey marine deposits
Drainage class: Well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 8 percent
Taxonomic classification: Fine, kaolinitic, thermic Typic Kandiudults

Geographically Associated Soils

Greenville, Norfolk, Orangeburg, and Red Bay soils are commonly associated with the Faceville series.

- The Greenville soils are in positions similar to those of the Faceville soils and have lower color values.
- The Norfolk soils are in positions similar to those of the Faceville soils or slightly lower, have hues that are more yellow, and have a fne-loamy control section.
- The Orangeburg soils are in positions similar to those of the Faceville soils or slightly lower and have a fne-loamy control section.
- The Red Bay soils are in positions similar to those of the Faceville soils, have lower color values, and have a fne-loamy control section.

Typical Pedon

Faceville sandy loam, 0 to 2 percent slopes; about 1.8 miles north of the Quitman and Clay County line on Georgia Highway 29 and 700 feet west of the highway; Quitman County, Georgia; Hatcher, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 48 minutes 19 seconds N. and long. 85 degrees 5 minutes 42 seconds W.

A—0 to 10 inches; reddish brown (5YR 4/4) sandy loam; weak fne granular structure; very friable; common fne roots; moderately acid; gradual wavy boundary.
Bt1—10 to 30 inches; red (2.5YR 4/6) sandy clay; moderate medium subangular blocky structure; frm; few fne roots; common distinct clay flms on faces of peds; strongly acid; gradual wavy boundary.
Bt2—30 to 72 inches; red (2.5YR 4/6) sandy clay; moderate fne subangular blocky structure; frm; common fne roots; common distinct clay flms on faces of peds; strongly acid; gradual wavy boundary.
Bt3—72 to 80 inches; red (2.5YR 5/6) sandy clay; moderate fne subangular blocky structure; frm; common fne roots; common distinct clay flms on faces of peds; few fne prominent strong brown (7.5YR 5/6) mottles; strongly acid.

Range in Characteristics

Thickness of the solum: More than 65 inches
Reaction: Very strongly acid or strongly acid throughout, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 2 to 6
Texture—sandy loam

Bt horizon:
Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8; or multicolored in shades of red, brown, and yellow
Texture—clay loam, sandy clay, or clay

BC horizon (where present):
Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8
Texture—sandy clay loam or sandy clay
Mottles—multicolored in shades of red, brown, and yellow

Goldsboro Series

Landform: Stream terraces
Parent material: Loamy marine deposits or loamy alluvial deposits
Drainage class: Moderately well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 2 percent
Taxonomic classification: Fine-loamy, siliceous, subactive, thermic Aquic Paleudults

Geographically Associated Soils

Grady, Iuka, Norfolk, Ochlockonee, Ocilla, and Orangeburg soils are commonly associated with the Goldsboro series.

- The Grady soils are in the lower, depressional positions; are poorly drained; and have a fine control section.
- The Iuka soils are in the lower positions on flood plains and are composed of stratified sandy and loamy alluvial material.
- The Norfolk and Orangeburg soils are in the higher positions and are well drained.
- The Ochlockonee soils are on flood plains and are composed of stratified loamy alluvial material.
- The Ocilla soils are in the lower positions, are somewhat poorly drained, and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches.

Typical Pedon

Goldsboro loamy sand, 0 to 2 percent slopes; about 1.8 miles south of the Quitman and Clay County line on Georgia Highway 39 and 200 feet south of the highway; Clay County, Georgia; Hatcher, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 45 minutes 30 seconds N. and long. 85 degrees 4 minutes 6 seconds W.

Ap—0 to 10 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; clear smooth boundary.
Bt1—10 to 18 inches; light yellowish brown (10YR 6/4) sandy loam; weak fine subangular blocky structure; friable; clay bridges between sand grains and few faint clay films on faces of peds; moderately acid; clear smooth boundary.
Bt2—18 to 33 inches; light yellowish brown (10YR 6/4) sandy clay loam; moderate medium subangular blocky structure; friable; clay bridges between sand grains and few faint clay films on faces of peds; common medium distinct light gray (10YR 7/2) iron depletions and many medium distinct yellowish brown (10YR 5/8) masses of iron accumulation; strongly acid; clear smooth boundary.
Btg1—33 to 60 inches; light gray (10YR 7/2) sandy clay loam; moderate medium subangular blocky structure; friable; clay bridges between sand grains and few faint clay films on faces of peds; common medium faint light gray (10YR 7/1) iron depletions and common medium prominent yellowish brown (10YR 5/8) and red (2.5YR 4/8) masses of iron accumulation; strongly acid; clear smooth boundary.

Btg2—60 to 80 inches; light gray (10YR 7/1) sandy clay loam; moderate medium subangular blocky structure; friable; clay bridges between sand grains and few faint clay films on faces of peds; common medium faint light gray (10YR 7/2) iron depletions and common medium prominent yellowish brown (10YR 5/8) and red (2.5YR 4/8) masses of iron accumulation; strongly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches
Reaction: Very strongly acid or strongly acid throughout, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4
Texture—loamy sand or sandy loam

E horizon (where present):
Color—hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6
Texture—loamy sand or sandy loam

Bt horizon, upper part:
Color—hue of 10YR, value of 5 to 7, and chroma of 4 to 6
Texture—sandy loam or sandy clay loam

Bt horizon, lower part:
Color—hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6
Texture—sandy loam or sandy clay loam
Redoximorphic features—few or common iron depletions in shades of gray and masses of iron accumulation in shades of red, yellow, and brown

Btg horizon:
Color—hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2
Texture—sandy loam or sandy clay loam
Redoximorphic features—common or many masses of iron accumulation in shades of red, yellow, and brown and iron depletions in shades of gray

Grady Series

Landform: Depressions
Parent material: Clayey marine deposits
Drainage class: Poorly drained
Permeability class: Slow
Depth class: Very deep
Slope: 0 to 2 percent
Taxonomic classification: Fine, kaolinitic, thermic Typic Paleaquults

Geographically Associated Soils

Goldsboro, Orangeburg, Red Bay, and Norfolk soils are commonly associated with the Grady series.

- The Goldsboro soils are in the higher positions, are moderately well drained, and have a fine-loamy control section.
- The Orangeburg, Red Bay, and Norfolk soils are in the higher positions, are well drained, and have a fine-loamy control section.

Typical Pedon

Grady clay loam, ponded; about 0.4 mile south of Five Points and 250 feet west of County Road 154; Randolph County, Georgia; Doverel, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 41 minutes 42 seconds N. and long. 84 degrees 33 minutes 35 seconds W.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) clay loam; moderate medium granular structure; friable; very strongly acid; clear smooth boundary.
Btg1—5 to 10 inches; gray (10YR 5/1) clay; moderate medium subangular blocky structure; very frm; common distinct clay flms on faces of peds; very strongly acid; gradual smooth boundary.
Btg2—10 to 30 inches; light brownish gray (10YR 6/2) clay; moderate medium subangular blocky structure; very frm; common distinct clay flms on faces of peds; very strongly acid; gradual smooth boundary.
Btg3—30 to 65 inches; light brownish gray (10YR 6/2) clay; moderate medium subangular blocky structure; very frm; common distinct clay flms on faces of peds; common medium distinct yellowish brown (10YR 5/8) and common medium prominent yellowish red (5YR 4/6) masses of iron accumulation; very strongly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches
Reaction: Extremely acid to strongly acid throughout, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 10YR, value of 2 or 3, and chroma of 1 or 2
Texture—loam or clay loam

Btg horizon:
Color—hue of 10YR to 5Y, value of 5 or 6, and chroma of 1 or 2
Texture—sandy clay or clay in the upper part; clay in the lower part
Redoximorphic features—few to common iron depletions in shades of gray and masses of iron accumulation in shades of yellow, brown, and red

Greenville Series

Landform: Broad interstream divides
Parent material: Clayey marine deposits
Drainage class: Well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 8 percent
Taxonomic classification: Fine, kaolinitic, thermic Rhodic Kandiudults

Geographically Associated Soils

Faceville, Orangeburg, and Red Bay soils are commonly associated with the Greenville series.

- The Faceville soils are in positions similar to those of the Greenville soils and have color values that are higher by 4 or more.
- The Orangeburg soils are in positions similar to those of the Greenville soils or slightly lower, have color values that are higher by 4 or more, and have a fne-loamy control section.
- The Red Bay soils are in positions similar to those of the Greenville soils or slightly lower and have a fne-loamy control section.

Typical Pedon

Greenville sandy clay loam, 0 to 2 percent slopes; about 0.5 mile east of Carter Creek on County Road 22, about 0.8 mile north on County Road 73, and 150 feet west; Randolph county, Georgia; Martins Crossroads, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 39 minutes 16 seconds N. and long. 84 degrees 42 minutes 47 seconds W.

Ap—0 to 8 inches; dark reddish brown (5YR 3/3) sandy clay loam; weak medium granular structure; very friable; few fine roots; strongly acid; abrupt smooth boundary.

Bt1—8 to 45 inches; dark red (10R 3/6) sandy clay; moderate medium subangular blocky structure; firm; common fine roots; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—45 to 80 inches; dark red (2.5YR 3/6) sandy clay; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; strongly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches

Reaction: Very strongly acid to moderately acid throughout, except where the surface layer has been limed

A or Ap horizon:

Color—hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 2 to 6

Texture—sandy clay loam

Bt horizon:

Color—hue of 10R or 2.5YR, value of 2 or 3, and chroma of 2 to 6

Texture—clay loam, sandy clay, or clay

Iuka Series

Landform: Flood plains

Parent material: Stratified loamy and sandy alluvium

Drainage class: Moderately well drained

Permeability class: Moderate

Depth class: Very deep

Slope: 0 to 2 percent

Taxonomic classification: Coarse-loamy, siliceous, active, acid, thermic Aquic Udifluvents

Geographically Associated Soils

Bibb, Chastain, Goldsboro, Kinston, Ochlockonee, and Rains are commonly associated with the Iuka series.

- The Bibb soils are in the lower positions on flood plains and are poorly drained.
- The Chastain soils are in the lower positions on flood plains, are poorly drained, and have a fine control section.
- The Goldsboro soils are on stream terraces and have a fine-loamy control section.
- The Kinston soils are in the lower positions on flood plains, are poorly drained, and have a fine-loamy control section.
- The Ochlockonee soils are in the higher positions on uplands and are well drained.
- The Rains soils are in the slightly lower positions and have a fine-loamy control section.

Typical Pedon

Iuka loamy sand in an area of Ochlockonee, Iuka, and Bibb soils, 0 to 5 percent slopes, frequently flooded; about 4.4 miles along Renfroe Road (County Road 46) from the intersection of Renfroe Road and State Road 520 and 0.5 mile along a dirt road to a creek bottom; Stewart County, Georgia; Louvale, Georgia, USGS 7.5-minute quadrangle; lat. 32 degrees 11 minutes 32 seconds N. and long. 84 degrees 44 minutes 59 seconds W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) loamy sand; weak medium granular structure; very friable; moderately acid; gradual wavy boundary.

C1—3 to 20 inches; strong brown (7.5YR 5/6), brownish yellow (10YR 6/6), and yellowish brown (10YR 5/4) stratifed fne sand to fne sandy loam; single grain; very friable; very strongly acid; gradual wavy boundary.

C2—20 to 34 inches; light yellowish brown (10YR 6/4) and pale brown (10YR 6/3) fne sandy loam; massive; friable; common fne distinct light brownish gray (10YR 6/2) iron depletions and common fne faint brownish yellow (10YR 6/6) masses of iron accumulation; very strongly acid; gradual wavy boundary.

Cg—34 to 80 inches; light gray (2.5Y 7/1) and gray (2.5Y 6/1) fne sandy loam; massive; friable; common medium prominent reddish yellow (7.5YR 6/6), many medium prominent light yellowish brown (10YR 6/4), and many medium prominent yellowish red (5YR 5/6) masses of iron accumulation; very strongly acid.

Range in Characteristics

Reaction: Strongly acid or very strongly acid, except where the surface layer has been limed

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 2 to 4
Texture—loamy sand

C horizon:

Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6
Texture—dominantly sandy loam or fne sandy loam; thin gravelly or sandy strata in some pedons; sandy clay loam or clay loam below a depth of 40 inches in some pedons
Redoximorphic features—few or common iron depletions in shades of gray within 20 inches of the surface

Cg horizon:

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2
Texture—loamy sand, sandy loam, or fne sandy loam
Redoximorphic features—common or many masses of iron accumulation in shades of red, yellow, and brown and iron depletions in shades of gray

Kinston Series

Landform: Flood plains
Parent material: Stratifed sandy and loamy alluvium
Drainage class: Poorly drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 1 percent
Taxonomic classification: Fine-loamy, siliceous, semiactive, acid, thermic Fluvaquentic Endoaquepts

Geographically Associated Soils

Bibb, Iuka, and Ochlockonee soils are commonly associated with the Kinston series.

- The Bibb soils are in positions similar to those of the Kinston soils and have a coarse-loamy control section.

- The Iuka soils are in the higher positions on the food plains and are moderately well drained.
- The Ochlockonee soils are in the higher positions on the food plains and are well drained.

Typical Pedon

Kinston loam in an area of Kinston and Bibb soils, 0 to 1 percent slopes, frequently fooded; about 3,800 feet west of the Randolph and Terrell County line on County Road 155 and 400 feet north in the food plain along Ichawaynochaway Creek; Randolph County, Georgia; Sanford, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 54 minutes 5 seconds N. and long. 84 degrees 36 minutes 53 seconds W.

A1—0 to 3 inches; dark gray (10YR 4/1) loam; weak fne subangular blocky structure; friable; common fne, common medium, and common coarse roots; many faint yellowish red (5YR 5/6) masses of iron accumulation; strongly acid; clear wavy boundary.

A2—3 to 8 inches; very dark gray (10YR 3/1) silt loam; weak fne subangular blocky structure; friable; common medium, common fne, and common coarse roots; common faint yellowish red (5YR 5/6) masses of iron accumulation; strongly acid; clear wavy boundary.

Bg—8 to 15 inches; dark gray (2.5Y 4/1) clay loam; weak medium subangular blocky structure; frm; common medium, common coarse, and few fne roots; strongly acid; clear wavy boundary.

Ab—15 to 33 inches; very dark gray (10YR 3/1) sandy loam; massive; friable; common medium and common coarse roots; common medium distinct light brownish gray (10YR 6/2) iron depletions and common medium distinct pale brown (10YR 6/3) masses of iron accumulation; very strongly acid; clear wavy boundary.

Cg1—33 to 52 inches; dark gray (10YR 4/1) sandy clay loam; massive; frm; few coarse roots; common fne and medium distinct dark yellowish brown (10YR 4/4) masses of iron accumulation; very strongly acid; gradual wavy boundary.

Cg2—52 to 80 inches; dark gray (10YR 4/1) loamy sand; massive; friable; very strongly acid.

Range in Characteristics

Reaction: Very strongly acid or strongly acid throughout, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 10YR, value of 2 to 5, and chroma of 1 to 3; or neutral in hue and value of 5
Texture—loamy sand, sandy loam, fne sandy loam, silt loam, or loam
Redoximorphic features—no, few, or common iron depletions in shades of gray and masses of iron accumulation in shades of brown, yellow, and red

Ag horizon (where present):
Color—hue of 10YR, value of 5, and chroma of 1; or neutral in hue and value of 5
Texture—loamy sand, sandy loam, fne sandy loam, silt loam, or loam

Bg horizon:
Color—hue of 10YR to 5Y, value of 3 to 7, and chroma of 1 or 2; hue of 5GY to 5BG, value of 6, and chroma of 1; or neutral in hue and value of 4 to 6
Texture—sandy loam, fne sandy loam, loam, sandy clay loam, or clay loam
Redoximorphic features—few or common masses of iron accumulation in shades of yellow, brown, and red

Ab horizon:
Color—hue of 10YR, value of 3, and chroma of 1 or 2

Texture—sandy loam, fine sandy loam, loam, or sandy clay loam
Redoximorphic features—no, few, or common masses of iron accumulation in shades of brown and yellow and iron depletions in shades of gray

Cg or C'g horizon:
Color—hue of 10YR to 5Y, value of 3 to 7, and chroma of 1 or 2; hue of 5GY to 5BG, value of 6, and chroma of 1; or neutral in hue and value of 4 to 6
Texture—sandy loam, sandy clay loam, or clay loam; or, below a depth of 40 inches, loamy sand or loamy fine sand
Redoximorphic features—few or common masses of iron accumulation in shades of yellow, brown, and red

Kolomoki Series

Landform: River terraces
Parent material: Clayey and sandy alluvium
Drainage class: Well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 2 percent
Taxonomic classification: Fine, kaolinitic, thermic Typic Hapludults

Geographically Associated Soils

Chastain and Wahee soils are commonly associated with the Kolomoki series.

- The Chastain soils are in the lower positions and are poorly drained.
- The Wahee soils are in the slightly lower positions and are somewhat poorly drained.

Typical Pedon

Kolomoki fine sandy loam, 0 to 2 percent slopes, rarely flooded; in a cultivated field about 0.5 mile south on Georgia Highway 39 from the intersection of Georgia Highway 39 and Georgia Highway 37 and 0.9 mile southwest on a dirt road; Clay County, Georgia; Fort Gaines NE, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 35 minutes 4 seconds N. and long. 85 degrees 3 minutes 12 seconds W.

Ap—0 to 9 inches; brown (7.5YR 4/4) fine sandy loam; weak fine granular structure; friable; few fine flakes of mica; moderately acid; abrupt smooth boundary.
Bt1—9 to 13 inches; yellowish red (5YR 5/6) sandy clay loam; weak fine subangular blocky structure; very friable; few faint clay films on faces of peds; few fine flakes of mica; moderately acid; clear smooth boundary.
Bt2—13 to 28 inches; red (2.5YR 4/6) sandy clay; moderate fine subangular blocky structure; firm; few faint clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.
Bt3—28 to 41 inches; yellowish red (5YR 5/6) sandy clay; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.
BC—41 to 48 inches; strong brown (7.5YR 5/8) sandy loam; weak fine subangular blocky structure; friable; many fine flakes of mica; strongly acid; gradual wavy boundary.
C—48 to 72 inches; strong brown (7.5YR 5/8) loamy coarse sand; single grain; loose; many fine flakes of mica; strongly acid.

Range in Characteristics

Thickness of the solum: 30 to 55 inches
Reaction: Very strongly acid to moderately acid throughout, except where the surface layer has been limed

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4
Texture—loamy sand, loamy fne sand, sandy loam, or fne sandy loam

BA or BE horizon (where present):

Color—hue of 7.5YR, value of 4 or 5, and chroma of 4 to 6
Texture—sandy loam or sandy clay loam

Bt horizon:

Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8
Texture—sandy clay loam, sandy clay, clay loam, or clay
Redoximorphic features—no, few, or common masses of iron accumulation in shades of yellow or brown

BC horizon:

Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 to 8
Texture—sandy loam or sandy clay loam
Redoximorphic features—no, few, or common masses of iron accumulation in shades of yellow or brown

C horizon:

Color—hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 to 8
Texture—sandy loam or sandy clay loam and, below a depth of 40 inches, loamy sand, loamy coarse sand, sand, or coarse sand; stratifed layers of contrasting textures in some pedons
Redoximorphic features—no, few, or common masses of iron accumulation in shades of yellow or brown

Lakeland Series

Landform: Broad interstream divides
Parent material: Sandy marine deposits
Drainage class: Excessively drained
Permeability class: Rapid
Depth class: Very deep
Slope: 0 to 15 percent
Taxonomic classification: Thermic, coated Typic Quartzipsamments

Geographically Associated Soils

Ailey, Benevolence, Blanton, and Troup soils are commonly associated with the Lakeland se> axo

Randolph County, Georgia; Coleman, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 38 minutes 45 seconds N. and long. 84 degrees 55 minutes 2 seconds W.

Ap—0 to 4 inches; dark yellowish brown (10YR 4/4) sand; single grain; loose; common fine and common medium roots; strongly acid; clear wavy boundary.
C1—4 to 25 inches; yellowish brown (10YR 5/6) sand; single grain; loose; common fine and common medium roots; strongly acid; gradual smooth boundary.
C2—25 to 60 inches; yellowish brown (10YR 5/8) sand; single grain; loose; few fine roots; strongly acid; clear smooth boundary.
C3—60 to 80 inches; strong brown (7.5YR 5/8) sand; single grain; loose; strongly acid.

Range in Characteristics

Combined thickness of the sand layers: More than 80 inches
Reaction: Strongly acid or moderately acid throughout, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4
Texture—sand

C horizon:
Color—hue of 5YR to 10YR, value of 5 to 7, and chroma of 4 to 8
Texture—sand or fine sand

Lucy Series

Landform: Broad interstream divides
Parent material: Sandy and loamy marine deposits
Drainage class: Well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 15 percent
Taxonomic classification: Loamy, kaolinitic, thermic Arenic Kandiudults

Geographically Associated Soils

Benevolence, Cowarts, Orangeburg, and Troup soils are commonly associated with the Lucy series.

- The Benevolence and Orangeburg soils are in positions similar to those of the Lucy soils or slightly lower and do not have thick, sandy surface and subsurface layers.
- The Cowarts soils are in the slightly lower positions and do not have thick, sandy surface and subsurface layers.
- The Troup soils are in positions similar to those of the Lucy soils or slightly higher, are somewhat excessively drained, and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches.

Typical Pedon

Lucy loamy sand, 0 to 5 percent slopes; about 1.5 miles west of Coleman on Georgia Highway 266 and 550 feet south of the highway; Randolph County, Georgia; Coleman, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 40 minutes 8 seconds N. and long. 84 degrees 54 minutes 38 seconds W.

Ap—0 to 8 inches; grayish brown (10YR 5/2) loamy sand; weak fine granular structure; very friable; common fine and common medium roots; moderately acid; clear smooth boundary.

E—8 to 24 inches; brown (7.5YR 5/4) loamy sand; weak fine granular structure; very friable; common fine and common medium roots; moderately acid; gradual smooth boundary.

Bt1—24 to 48 inches; yellowish red (5YR 5/8) sandy loam; weak fine subangular blocky structure; very friable; common fine and common medium roots; strongly acid; gradual wavy boundary.

Bt2—48 to 72 inches; red (2.5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable; common fine and common medium roots; strongly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches

Thickness of the sandy epipedon: 20 to 40 inches

Reaction: Very strongly acid to moderately acid in the A and E horizons and very strongly acid or strongly acid in the Bt horizon, except where the surface layer has been limed

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4

Texture—loamy sand or loamy fine sand

E horizon:

Color—hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 6

Texture—loamy sand or loamy fine sand

BE horizon (where present):

Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8

Texture—loamy sand, loamy fine sand, or sandy loam

Bt horizon:

Color—dominantly hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 6 to 8; hue of 7.5YR or 10YR in the upper 10 inches of the horizon in some pedons

Texture—sandy loam, sandy clay loam, or, below a depth of 50 inches, sandy clay

Redoximorphic features—no, few, or common masses of iron accumulation in shades of brown, red, and yellow below a depth of 40 inches

Maubila Series

Landform: Hillslopes and interfluves

Parent material: Clayey marine deposits

Drainage class: Moderately well drained

Permeability class: Slow

Depth class: Very deep

Slope: 3 to 45 percent

Taxonomic classification: Fine, mixed, subactive, thermic Aquic Hapludults

Geographically Associated Soils

Ailey, Cowarts, and Nankin soils are commonly associated with the Maubila series.

- The Ailey soils are in positions similar to those of the Maubila soils, are well drained, and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches over dense, brittle layers.
- The Cowarts soils are in positions similar to those of the Maubila soils or lower, are well drained, and have a fine-loamy control section.
- The Nankin soils are in positions similar to those of the Maubila soils and are well drained.

Typical Pedon

Maubila faggy sandy loam in an area of Cowarts-Maubila complex, 8 to 15 percent slopes; Barbour County, Alabama; Clayton North, Alabama, USGS 7.5-minute quadrangle; lat. 31 degrees 56 minutes 24 seconds N. and long. 85 degrees 29 minutes 5 seconds W.

A—0 to 4 inches; brown (10YR 4/3) faggy sandy loam; weak fne granular structure; very friable; 25 percent angular fragments of ironstone; very strongly acid; clear smooth boundary.

Bt1—4 to 26 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; frm; 10 percent angular fragments of ironstone; very strongly acid; clear wavy boundary.

Bt2—26 to 40 inches; yellowish brown (10YR 5/6) clay; strong medium subangular blocky structure; very frm; common medium distinct red (10R 4/6) masses of iron accumulation; 10 percent angular fragments of ironstone; very strongly acid; abrupt wavy boundary.

Bt3—40 to 52 inches; yellowish brown (10YR 5/6) clay; strong coarse angular blocky structure; very frm; many medium prominent gray (10YR 6/1) iron depletions and fne and medium distinct light red (10R 6/6) masses of iron accumulation; 10 percent angular fragments of ironstone; very strongly acid; clear irregular boundary.

BC—52 to 57 inches; 40 percent gray (10YR 6/1), 30 percent yellowish brown (10YR 5/6), and 30 percent light red (10R 6/6) clay; weak coarse angular blocky structure; very frm; 5 percent angular fragments of ironstone; the areas of yellowish brown and light red are iron accumulation; the areas of gray are iron depletions; very strongly acid; gradual wavy boundary.

C—57 to 72 inches; 40 percent gray (10YR 6/1), 30 percent strong brown (7.5YR 5/8), and 30 percent red (2.5YR 5/8) clay; massive; very frm; common discontinuous strata of ironstone; the areas of strong brown and red are iron accumulation; the areas of gray are iron depletions; very strongly acid.

Range in Characteristics

Thickness of the solum: 40 to 60 inches

Rock fragments: 5 to 35 percent, by volume, ironstone fragments in the A and E horizon and less than 15 percent, by volume, in the B and C horizons

Reaction: Extremely acid to strongly acid throughout, except where the surface has been limed

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4

Texture—loamy sand, loamy fne sand, sandy loam, or loam in the fne-earth fraction

E horizon (where present):

Color—hue of 10YR, value of 5 or 6, and chroma of 2 to 4

Texture—loamy sand, loamy fne sand, or sandy loam in the fne-earth fraction

Bt horizon (upper part):

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 6 to 8

Texture—clay loam or clay

Redoximorphic features—no, few, or common masses of iron accumulation in shades of red and brown and iron depletions in shades of gray

Bt horizon (lower part):

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 6 to 8; or multicolored in shades of gray, yellow, red, and brown

Texture—clay loam, clay, or silty clay
Redoximorphic features—common or many masses of iron accumulation in shades of red and brown and iron depletions in shades of gray

BC horizon:
Color—multicolored in shades of gray, yellow, red, and brown
Texture—silty clay, clay loam, or clay
Redoximorphic features—masses of iron accumulation in shades of red, yellow, and brown and iron depletions in shades of gray

C horizon:
Color—multicolored in shades of gray, yellow, red, and brown
Texture—silty clay, clay loam, or clay
Redoximorphic features—iron depletions in shades of gray and masses of iron accumulation in shades of red, yellow, and brown

Nankin Series

Landform: Hillslopes and interfluves
Parent material: Clayey marine deposits
Drainage class: Well drained
Permeability class: Moderately slow
Depth class: Very deep
Slope: 2 to 45 percent
Taxonomic classification: Fine, kaolinitic, thermic Typic Kanhapludults

Geographically Associated Soils

Ailey, Cowarts, Maubila, Norfolk, and Orangeburg soils are commonly associated with the Nankin series.

- The Ailey soils are in positions similar to those of the Nankin soils or slightly higher and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches over a dense, brittle subsoil.
- The Cowarts soils are in positions similar to those of the Nankin soils, have a solum that ranges from 20 to 40 inches in thickness, and have a fine-loamy control section.
- The Maubila soils are in positions similar to those of the Nankin soils and are moderately well drained.
- The Norfolk and Orangeburg soils are in the higher positions, have a solum that is more than 60 inches thick, and have a fine-loamy control section.

Typical Pedon

Nankin loamy sand in an area of Nankin-Cowarts complex, 15 to 35 percent slopes; about 0.6 mile north of Sharon Church, 2,800 feet west of County Road 28, and 3,100 feet south of the Stewart County line; Randolph County, Georgia; Sanford, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 54 minutes 57 seconds N. and long. 84 degrees 53 minutes 28 seconds W.

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary.
BA—4 to 10 inches; dark yellowish brown (10YR 4/4) sandy loam; weak coarse subangular blocky structure; very friable; strongly acid; gradual wavy boundary.
Bt1—10 to 16 inches; yellowish brown (10YR 5/8) sandy clay loam; moderate coarse subangular blocky structure; friable; few faint clay films on faces of peds; few medium distinct strong brown (7.5YR 5/8) masses of iron accumulation; strongly acid; gradual wavy boundary.

Bt2—16 to 34 inches; yellowish red (5YR 5/8) sandy clay; moderate medium subangular blocky structure; firm; strongly acid; gradual wavy boundary.

Bt3—34 to 39 inches; yellowish red (5YR 5/8) sandy clay; weak medium subangular

Norfolk Series

Landform: Interfuves
Parent material: Loamy marine deposits
Drainage class: Well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 5 percent
Taxonomic classification: Fine-loamy, kaolinitic, thermic Typic Kandiudults

Geographically Associated Soils

Blanton, Bonneau, Faceville, Goldsboro, Grady, Nankin, Ocilla, Orangeburg, Rains, and Red Bay soils are commonly associated with the Norfolk series.

- The Blanton soils are in positions similar to those of the Norfolk soils or slightly higher and have surface and subsurface layers with a combined thickness of 40 to 80 inches.
- The Bonneau soils are in positions similar to those of the Norfolk soils or slightly higher and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches.
- The Faceville soils are in positions similar to those of the Norfolk soils or slightly higher and have a fne control section.
- The Goldsboro soils are in the lower positions and are moderately well drained.
- The Grady soils are in lower depressional positions, are poorly drained, and have a fne control section.
- The Nankin soils are on adjacent, lower slopes; have a fne control section; and have a solum that is less than 60 inches thick.
- The Ocilla soils are in the lower positions, have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches, and are somewhat poorly drained.
- The Orangeburg and Red Bay soils are in positions similar to those of the Norfolk soils or slightly higher and have redder hues.
- The Rains soils are in the lower positions and are poorly drained.

Typical Pedon

Norfolk loamy sand, 0 to 2 percent slopes; about 1.2 miles south of Pataula Creek on Georgia Highway 39, west 0.4 mile along a feld border, and 85 feet north of a ditch; Clay County, Georgia; Fort Gaines NE, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 44 minutes 5 seconds N. and long. 85 degrees 3 minutes 7 seconds W.

Ap—0 to 6 inches; brown (10YR 4/3) loamy sand; weak fne granular structure; very friable; moderately acid; abrupt smooth boundary.

Bt1—6 to 10 inches; brownish yellow (10YR 6/8) sandy loam; weak medium subangular blocky structure; very friable; clay bridges between sand grains; strongly acid; clear smooth boundary.

Bt2—10 to 30 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; few distinct clay flms on faces of peds; strongly acid; gradual wavy boundary.

Bt3—30 to 55 inches; brownish yellow (10YR 6/8) sandy clay loam; moderate medium subangular blocky structure; friable; common distinct clay flms on faces of peds; strongly acid; gradual wavy boundary.

Bt4—55 to 70 inches; brownish yellow (10YR 6/8) sandy clay loam; weak medium subangular blocky structure; frm; few distinct clay flms on faces of peds; few fne prominent light brownish gray (10YR 6/2) iron depletions; few medium prominent yellowish red (5YR 5/8) and few medium distinct strong brown (7.5YR 4/6) masses of iron accumulation; 1 percent plinthite nodules; strongly acid; gradual wavy boundary.

BC—70 to 80 inches; yellowish brown (10YR 5/8) sandy loam; weak fne granular structure; very friable; few medium prominent light brownish gray (10YR 6/2) iron depletions; few medium distinct strong brown (7.5YR 5/8) and red (2.5YR 4/8) and few fne distinct brownish yellow (10YR 6/8) masses of iron accumulation; 3 percent plinthite nodules; strongly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches
Reaction: Extremely acid to strongly acid throughout, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4
Texture—loamy sand or sandy loam

E horizon (where present):
Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 6
Texture—loamy sand or sandy loam

Bt horizon:
Color—hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 3 to 8
Texture—sandy loam or sandy clay loam
Redoximorphic features (below a depth of 48 inches)—no, few, common, or many iron depletions in shades of gray and masses of iron accumulation in shades of red, brown, and yellow

BC horizon:
Color—hue of 5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8; or multicolored in shades of yellow, brown, red, and gray
Texture—sandy loam or sandy clay loam
Redoximorphic features—few, common, or many iron depletions in shades of gray and masses of iron accumulation in shades of red, brown, and yellow

Ochlockonee Series

Landform: Flood plains
Parent material: Loamy alluvium
Drainage class: Well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 3 percent
Taxonomic classification: Coarse-loamy, siliceous, active, acid, thermic Typic Udifuvents

Geographically Associated Soils

Bibb, Chastain, Goldsboro, Iuka, Kinston, and Rains are commonly associated with the Ochlockonee series.

- The Bibb soils are in the lower positions on food plains and are poorly drained.
- The Chastain soils are in the lower positions on food plains, are poorly drained, and have a fne control section.
- The Goldsboro soils are in upland positions, are moderately well drained, and have a fne-loamy control section.
- The Iuka soils are in the slightly lower positions on food plains and are moderately well drained.
- The Kinston soils are in the lower positions on food plains, are poorly drained, and have a fne-loamy control section.

- The Rains are in the lower positions, are poorly drained, and have a fine-loamy control section.

Typical Pedon

Ochlockonee loamy fine sand in an area of Ochlockonee, Iuka, and Bibb soils, 0 to 5 percent slopes, frequently flooded; about 0.8 mile along Renfroe Road (County Road 46) from the intersection of Renfroe Road and State Road 520 and 100 feet left of the road in a flood plain along a stream; Stewart County, Georgia; Brooklyn, Georgia, USGS 7.5-minute quadrangle; lat. 32 degrees 13 minutes 12 seconds N. and long. 84 degrees 44 minutes 19 seconds W.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) loamy fine sand; weak medium granular structure; very friable; strongly acid; clear smooth boundary.

C1—4 to 32 inches; light yellowish brown (10YR 6/4), brownish yellow (10YR 6/6), and yellowish red (5YR 5/6) stratified sand to sandy loam; massive; friable; very strongly acid; gradual smooth boundary.

C2—32 to 62 inches; pale brown (10YR 6/3), light yellowish brown (10YR 6/4), and brownish yellow (10YR 6/6) fine sandy loam; massive; friable; very strongly acid; gradual smooth boundary.

C3—62 to 80 inches; gray (2.5Y 6/1) and light gray (2.5Y 7/1) loamy sand; massive; very friable; common fine prominent brownish yellow (10YR 6/6) masses of iron accumulation; very strongly acid.

Range in Characteristics

Reaction: Very strongly acid to slightly acid in the A or Ap horizon and very strongly acid or strongly acid below

Other features: Buried soil horizons below a depth of 25 inches in some pedons

A or Ap horizon:

Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8

Texture—loamy fine sand

C and C' horizon:

Color—hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8

Texture—sandy loam, fine sandy loam, loam, loamy sand, or loamy fine sand; thin strata of finer or coarser textured material are in most pedons

Redoximorphic features—no, few, or common masses of iron accumulation in shades of brown or yellow and iron depletions in shades of gray below a depth of 20 inches

Ab horizon (where present):

Color—hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8

Texture—loamy fine sand

Ocilla Series

Landform: Stream terraces

Parent material: Sandy and loamy marine deposits

Drainage class: Somewhat poorly drained

Permeability class: Moderately slow

Depth class: Very deep

Slope: 0 to 2 percent

Taxonomic classification: Loamy, siliceous, semiactive, thermic Aquic Arenic Paleudults

Geographically Associated Soils

Goldsboro, Norfolk, Orangeburg, and Rains soils are commonly associated with the Ocilla series.

- The Goldsboro soils are in the slightly higher positions and are moderately well drained.
- The Norfolk soils are in the higher positions and are well drained.
- The Orangeburg soils are in the higher positions and are well drained.
- The Rains soils are in the lower positions and are poorly drained.

Typical Pedon

Ocilla loamy sand, 0 to 2 percent slopes; in a cultivated field about 1.0 mile south of the Stewart County line on Georgia Highway 39 and 100 feet west of the road; Quitman County, Georgia; Georgetown, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 59 minutes 8 seconds N. and long. 85 degrees 3 minutes 12 seconds W.

Ap—0 to 10 inches; grayish brown (10YR 5/2) loamy sand; weak medium granular structure; very friable; moderately acid; abrupt smooth boundary.

E—10 to 24 inches; light brownish gray (10YR 6/2) loamy sand; moderate medium granular structure; friable; strongly acid; gradual wavy boundary.

Bt—24 to 32 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine distinct strong brown (7.5YR 5/8) masses of iron accumulation and light brownish gray (10YR 6/2) iron depletions; strongly acid; gradual wavy boundary.

Btg1—32 to 40 inches; light brownish gray (10YR 6/2) sandy clay loam; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; common medium distinct strong brown (7.5YR 5/8) and common medium prominent yellowish red (5YR 5/8) masses of iron accumulation; strongly acid; gradual wavy boundary.

Btg2—40 to 58 inches; light brownish gray (10YR 6/2) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; many coarse distinct strong brown (7.5YR 5/8) and many coarse prominent red (2.5YR 5/8) masses of iron accumulation; strongly acid; gradual wavy boundary.

Btg3—58 to 72 inches; light brownish gray (10YR 6/2) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; many coarse distinct brownish yellow (10YR 6/6) masses of iron accumulation; strongly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches

Reaction: Very strongly acid or strongly acid throughout, except where the surface layer has been limed

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2

Texture—loamy sand or loamy fine sand

E horizon:

Color—hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 to 4

Texture—loamy sand or loamy fine sand

Redoximorphic features—no, few, or common masses of iron accumulation in shades of brown or yellow and iron depletions in shades of gray

Bt horizon, upper part:

Color—hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 2 to 8

Texture—sandy loam or sandy clay loam

Redoximorphic features—no, few, common, or many masses of iron accumulation in shades of brown, red, or yellow and iron depletions in shades of gray

Bt horizon, lower part (where present):

Color—hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 to 8; neutral in hue and value of 7; or multicolored in shades of gray, yellow, brown, and red

Texture—sandy clay loam or sandy clay
Redoximorphic features—few, common, or many masses of iron accumulation in shades of brown, red, or yellow and iron depletions in shades of gray

Btg, BC, or BCg horizon (where present):
Color—hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 to 8; neutral in hue and value of 7; or multicolored in shades of gray, yellow, brown, and red
Texture—sandy clay loam or sandy clay
Redoximorphic features—few, common, or many masses of iron accumulation in shades of brown, red, or yellow and iron depletions in shades of gray

Orangeburg Series

Landform: Broad interstream divides
Parent material: Loamy marine deposits
Drainage class: Well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 15 percent
Taxonomic classification: Fine-loamy, kaolinitic, thermic Typic Kandiudults

Geographically Associated Soils

Benevolence, Bonneau, Faceville, Grady, Greenville, Lucy, Nankin, Norfolk, Ocilla, Red Bay, and Troup soils are commonly associated with the Orangeburg series.

- The Benevolence soils are in positions similar to those of the Orangeburg soils and have a coarse-loamy control section.
- The Bonneau and Lucy soils are in positions similar to those of the Orangeburg soils and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches.
- The Faceville soils are in positions similar to those of the Orangeburg soils or slightly higher and have a fine control section.
- The Grady soils are in lower depressional positions, are poorly drained, and have a fine control section.
- The Greenville soils are in positions similar to those of the Orangeburg soils or slightly higher, have a fine control section, and have lower color values.
- The Nankin soils are on the lower slopes adjacent to the Orangeburg soils and have a fine control section.
- The Norfolk soils are in positions similar to those of the Orangeburg soils or slightly lower and have hues that are more yellow.
- The Ocilla soils are in the lower positions, have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches, and are somewhat poorly drained.
- The Red Bay soils are in positions similar to those of the Orangeburg soils or slightly higher and have lower color values.
- The Troup soils are in the slightly higher positions, are somewhat excessively drained, and have sandy surface and subsurface layers with a combined thickness of 40 to 80 inches.

Typical Pedon

Orangeburg loamy sand, 0 to 2 percent slopes; about 0.3 mile southeast of the Clay and Quitman County line on County Road 61 and 400 feet north of the highway; Clay County, Georgia; Hatcher, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 46 minutes 10 seconds N. and long. 85 degrees 3 minutes 11 seconds W.

Ap—0 to 7 inches; dark brown (10YR 3/3) loamy sand; weak fine granular structure; very friable; slightly acid; abrupt smooth boundary.

BA—7 to 11 inches; yellowish red (5YR 4/6) sandy loam; weak fine subangular blocky structure; friable; clay bridges between sand grains; slightly acid; clear smooth boundary.

Bt1—11 to 22 inches; red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—22 to 80 inches; red (2.5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable; common distinct clay films on faces of peds; strongly acid.

Range in Characteristics

Thickness of the solum: More than 70 inches

Reaction: Very strongly acid to moderately acid in the upper part of the solum and very strongly acid or strongly acid in the lower part, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4
Texture—loamy sand or sandy loam

E horizon (where present):
Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 or 4
Texture—loamy sand

BA horizon:
Color—hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 6
Texture—sandy loam

Bt horizon:
Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8
Texture—dominantly sandy clay loam; sandy clay in lower part of the horizon in some pedons
Redoximorphic features—no, few, or common masses of iron accumulation in shades of brown in the lower part of the horizon

Rains Series

Landform: Stream terraces and depressions
Parent material: Loamy marine and alluvium deposits
Drainage class: Poorly drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 2 percent
Taxonomic classification: Fine-loamy, siliceous, semiactive, thermic Typic Paleaquults

Geographically Associated Soils

Chastain, Iuka, Norfolk, Ochlockonee, and Ocilla soils are commonly associated with the Rains series.

- The Chastain soils are on flood plains in positions similar to those of the Rains soils or slightly lower and have a fine control section.
- The Iuka soils are in the slightly higher positions on flood plains, are moderately well drained, and have a coarse-loamy control section.
- The Norfolk soils are in the higher positions and are well drained.

- The Ochlockonee soils are in the slightly higher positions on flood plains, are well drained, and have a coarse-loamy control section.
- The Ocilla soils are in the slightly higher positions, have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches, and are somewhat poorly drained.

Typical Pedon

Rains sandy loam, 0 to 2 percent slopes, occasionally flooded; about 1.2 miles north of the bridge over Pataula Creek on Georgia Highway 39 and 120 feet southwest of the road; Clay County, Georgia; Hatcher, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 45 minutes 22 seconds N. and long. 85 degrees 4 minutes 1 second W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sandy loam; weak fine granular structure; very friable; moderately acid; abrupt smooth boundary.

Btg1—8 to 26 inches; gray (10YR 6/1) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; moderately acid; clear wavy boundary.

Btg2—26 to 38 inches; gray (10YR 6/1) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine prominent yellowish red (5YR 5/6) and common medium distinct strong brown (7.5YR 5/8) masses of iron accumulation; strongly acid; gradual wavy boundary.

Btg3—38 to 48 inches; gray (10YR 6/1) sandy clay loam; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; common medium distinct strong brown (7.5YR 5/8) and common medium distinct yellowish red (5YR 5/6) masses of iron accumulation; strongly acid; gradual wavy boundary.

Btg4—48 to 52 inches; gray (10YR 6/1) sandy clay loam; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; many coarse distinct strong brown (7.5YR 5/8) and many coarse prominent yellowish red (5YR 5/6) masses of iron accumulation; strongly acid; gradual wavy boundary.

Btg5—52 to 72 inches; gray (10YR 6/1) sandy clay loam; moderate medium subangular blocky structure; firm; strongly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches

Reaction: Extremely acid to slightly acid throughout, except where the surface layer has been limed

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 or 2; or neutral in hue and value of 2 to 5

Texture—loamy sand or sandy loam

Eg horizon (where present):

Color—hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or neutral in hue and value of 4 to 7

Texture—loamy sand or sandy loam

Redoximorphic features—no, few, or common masses of iron accumulation in shades of brown or yellow and iron depletions in shades of gray

Btg horizon, upper part:

Color—hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or neutral in hue and value of 4 to 7

Texture—sandy loam or sandy clay loam

Redoximorphic features—no, few, common, or many masses of iron accumulation in shades of brown, red, or yellow and iron depletions in shades of gray

Btg horizon, lower part:
Color—hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; or neutral in hue and value of 4 to 7
Texture—sandy loam, sandy clay loam, clay loam, or sandy clay
Redoximorphic features—no, few, common, or many masses of iron accumulation in shades of brown, red, or yellow and iron depletions in shades of gray

Red Bay Series

Landform: Broad interstream divides
Parent material: Loamy marine deposits
Drainage class: Well drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 15 percent
Taxonomic classification: Fine-loamy, kaolinitic, thermic Rhodic Kandiudults

Geographically Associated Soils

Benevolence, Faceville, Grady, Greenville, Norfolk, and Orangeburg soils are commonly associated with the Red Bay series.

- The Benevolence soils are in positions similar to those of the Red Bay soils or slightly lower, have color values that are higher by 4 or more, and have a coarse-loamy control section.
- The Faceville soils are in positions similar to those of the Red Bay soils, have color values that are higher by 4 or more, and have a fine control section.
- The Grady soils are in the lower, depressional positions; are poorly drained; and have a fine control section.
- The Greenville soils are in positions similar to those of the Red Bay soils or slightly higher and have a fine control section.
- The Norfolk soils are in slightly lower positions than the Red Bay soils and have color values that are higher by 4 or more.
- The Orangeburg soils are in positions similar to those of the Red Bay soils or slightly lower and have color values that are higher by 4 or more.

Typical Pedon

Red Bay loamy sand, 2 to 5 percent slopes; about 0.3 mile east of the intersection of Benevolence Road and County Road 105 and 200 feet south of the county road; Randolph County, Georgia; Benevolence, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 51 minutes 4 seconds N. and long. 84 degrees 44 minutes 49 seconds W.

Ap—0 to 8 inches; dark reddish brown (2.5YR 3/3) loamy sand; weak fine granular structure; very friable; slightly acid; clear smooth boundary.
Bt1—8 to 40 inches; dark red (2.5YR 3/6) sandy loam; weak medium subangular blocky structure; friable; many distinct clay bridges between sand grains; moderately acid; gradual smooth boundary.
Bt2—40 to 80 inches; dark red (10R 3/6) sandy clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; strongly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches
Reaction: Very strongly acid to moderately acid in the upper part of the solum and very strongly acid or strongly acid in the lower part, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 2 to 4
Texture—loamy sand or sandy loam

BA horizon (where present):
Color—hue of 10R to 5YR, value of 3 or 4, and chroma of 4 to 6
Texture—sandy loam or sandy clay loam

Bt horizon:
Color—hue of 10R or 2.5YR, value of 3, and chroma of 4 to 6
Texture—sandy loam or sandy clay loam

Troup Series

Landform: Broad interstream divides
Parent material: Sandy and loamy marine deposits
Drainage class: Somewhat excessively drained
Permeability class: Moderate
Depth class: Very deep
Slope: 0 to 15 percent
Taxonomic classification: Loamy, kaolinitic, thermic Grossarenic Kandiudults

Geographically Associated Soils

Ailey, Benevolence, Blanton, Bonneau, Cowarts, Lakeland, Lucy, and Orangeburg soils are commonly associated with the Troup series.

- The Ailey soils are in the slightly lower positions, are well drained, and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches over a dense, brittle subsoil.
- The Benevolence soils are in the slightly lower positions, are well drained, and do not have thick, sandy surface and subsurface layers.
- The Blanton soils are in the slightly lower positions and have a more yellow subsoil than that of the Troup soils.
- The Bonneau soils are in the slightly lower positions, are well drained, and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches.
- The Cowarts soils are in the lower positions, are well drained, and do not have thick, sandy surface and subsurface layers.
- The Lakeland soils are in positions similar to those of the Troup soils, are excessively drained, and are sandy throughout.
- The Lucy soils are in positions similar to those of the Troup soils or slightly lower, are well drained, and have sandy surface and subsurface layers with a combined thickness of 20 to 40 inches.
- The Orangeburg soils are in the slightly lower positions, are well drained, and do not have thick, sandy surface and subsurface layers.

Typical Pedon

Troup loamy sand, 0 to 5 percent slopes; about 0.5 mile north of Ichawaynochaway Creek on Georgia Highway 41 and 500 feet west in a field; Randolph County, Georgia; Benevolence, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 53 minutes 55 seconds N. and long. 84 degrees 38 minutes 32 seconds W.

Ap—0 to 9 inches; brown (7.5YR 4/3) loamy sand; weak fine granular structure; very friable; slightly acid; clear smooth boundary.
E1—9 to 50 inches; strong brown (7.5YR 5/6) loamy sand; weak fine granular structure; very friable; moderately acid; gradual smooth boundary.

E2—50 to 60 inches; yellowish red (5YR 5/6) loamy sand; weak fine granular structure; very friable; moderately acid; gradual smooth boundary.
Bt—60 to 80 inches; red (2.5YR 4/8) sandy loam; weak medium subangular blocky structure; friable; very strongly acid.

Range in Characteristics

Thickness of the solum: More than 80 inches
Thickness of the sandy epipedon: 40 to 80 inches
Reaction: Very strongly acid or strongly acid throughout, except where the surface layer has been limed

A or Ap horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 4
Texture—sand or loamy sand

E horizon:
Color—hue of 5YR to 10YR, value of 5 to 7, and chroma of 4 to 8
Texture—sand or loamy sand

Bt horizon:
Color—hue of 10R to 5YR, value of 4 to 7, and chroma of 4 to 8
Texture—sandy loam or sandy clay loam

Wahee Series

Landform: River terraces
Parent material: Clayey alluvium, clayey marine deposits, or both
Drainage class: Somewhat poorly drained
Permeability class: Slow
Depth class: Very deep
Slope: 0 to 2 percent
Taxonomic classification: Fine, mixed, semiactive, thermic Aeric Endoaquults

Geographically Associated Soils

Chastain and Kolomoki soils are commonly associated with the Wahee series.

- The Chastain soils are in the lower positions and are poorly drained.
- The Kolomoki soils are in the higher positions on terraces and are well drained.

Typical Pedon

Wahee fine sandy loam, 0 to 2 percent slopes, rarely flooded; about 0.5 mile south on Georgia Highway 39 from the intersection of Georgia Highway 39 and Georgia Highway 37 and 0.65 mile southwest on a dirt road; Clay County, Georgia; Fort Gaines NE, Georgia, USGS 7.5-minute quadrangle; lat. 31 degrees 35 minutes 23 seconds N. and long. 85 degrees 3 minutes 9 seconds W.

Ap—0 to 5 inches; gray (10YR 5/1) fine sandy loam; weak fine granular structure; very friable; moderately acid; abrupt smooth boundary.
E—5 to 18 inches; pale brown (10YR 6/3) fine sandy loam; moderate medium granular structure; very friable; moderately acid; clear smooth boundary.
Bt—18 to 24 inches; pale brown (10YR 6/3) sandy clay; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine distinct yellowish brown (10YR 5/8) masses of iron accumulation and many medium distinct light brownish gray (10YR 6/2) iron depletions; strongly acid; gradual wavy boundary.
Btg1—24 to 32 inches; grayish brown (10YR 5/2) sandy clay; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; common

medium distinct yellowish brown (10YR 5/8) and red (2.5YR 4/8) masses of iron accumulation; strongly acid; gradual wavy boundary.

Btg2—32 to 72 inches; grayish brown (10YR 5/2) sandy clay; moderate medium subangular blocky structure; firm; few faint clay films on faces of peds; common fine distinct yellowish brown (10YR 5/8) masses of iron accumulation; strongly acid.

Range in Characteristics

Thickness of the solum: 30 to more than 60 inches

Reaction: Very strongly acid to moderately acid in the A and E horizons and extremely acid to strongly acid in the B and C horizons, except where the surface layer has been limed

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 to 3; or neutral in hue and value of 2 to 5

Texture—sandy loam or fine sandy loam

E horizon:

Color—hue of 10YR to 5Y, value of 5 to 7, and chroma of 2 to 4

Texture—sandy loam or fine sandy loam

Bt horizon:

Color—hue of 10YR to 5Y, value of 5 to 7, and chroma of 3 to 8

Texture—sandy clay loam, sandy clay, clay loam, or clay

Redoximorphic features—few, common, or many masses of iron accumulation in shades of red, yellow, or brown and iron depletions in shades of gray

Btg horizon:

Color—hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2; or neutral in hue and value of 5 to 7

Texture—sandy clay, clay loam, or clay

Redoximorphic features—few, common, or many masses of iron accumulation in shades of red, yellow, or brown and iron depletions in shades of gray, olive, or white

Cg horizon (where present):

Color—hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 to 2

Texture—variable, ranging from sandy loam to clay

Redoximorphic features—few, common, or many masses of iron accumulation in shades of red, yellow, or brown and iron depletions in shades of gray, olive, or white

Formation of the Soils

Soil characteristics are determined by the physical and mineral composition of the parent material; the climate under which the parent material accumulated and has existed since accumulation; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time that the forces of soil formation have acted on the soil material. All of these factors influence every soil, but the significance of each factor varies from place to place. In one area, one factor may dominate soil formation; in another area, a different factor may be the most important. The interrelationships among these five factors are complex and the effects of any one factor cannot be isolated and completely evaluated. It is convenient, however, to discuss each factor separately and to indicate the probable effects of each.

Parent Material

Parent material is the unconsolidated mass in which soil forms. The chemical and mineralogical composition of the soil is largely derived from the parent material. Stewart County is underlain by Coastal Plain sedimentary rock (Georgia Department of Natural Resources, 1976). Sandy to clayey marine sediments overlie the rock. There is a network of geologic formations throughout the county.

In the southeastern part of the county is a nearly level to undulating, rolling body of land composed of the Altamaha Formation. The dominant soils that formed in these materials are characterized by brownish, sandy surface and subsurface layers and brownish or reddish subsoils. Faceville, Greenville, Norfolk, Orangeburg, and Red Bay soils are the main soils that formed in these parent materials. Also within this area is the Claiborne Group. Soils that formed in materials derived from the Claiborne Group typically have thick, sandy surface and subsurface layers. Examples are the Bonneau, Lucy, and Troup soils.

In the central, southwestern, and northwestern parts of the county are other formations, including the Clayton, Nanafalia, Providence, and Tuscahoma Formations. These formations contain layered beds of clayey and sandy materials. Land surfaces are primarily narrow ridges and side slopes. Ailey, Cowarts, Maubila, and Nankin soils are the primary soils that formed in materials derived from these formations. These soils have yellowish brown or reddish subsoils and commonly have dense, slowly permeable layers beneath the subsoil.

Alluvial material is adjacent to the Chattahoochee River and to streams and low-lying areas throughout the survey area. Soils that formed in alluvial material are more recent in origin than soils that formed on uplands. Chastain, Kolomoki, and Wahee soils formed in clayey alluvium along the Chattahoochee River. Bibb, Iuka, Kinston, and Ochlockonee soils formed in sandy and loamy alluvium along Hannahatchee Creek and several smaller creeks throughout the area.

Climate

The present climate of the survey area is probably similar to the climate that existed as the soils formed. The relatively high rainfall and warm temperatures contribute to rapid soil formation. They are the most important climatic features related to soil properties. Water from precipitation is essential to the formation of soil. Water dissolves soluble materials and is used by plants and animals. It transports material from one part of the soil to another part or from one area to another area. Soils in the survey area formed under a thermic temperature regime; that is, the mean soil temperature at a depth of 20 inches is 59 to 72 degrees Fahrenheit. The rate of chemical reactions and other processes in the soil depends to some extent on temperature. In addition, temperature affects the type and quantity of vegetation, the amount and kind of organic matter, and the rate of decomposition of organic matter.

Plants and Animals

The role of plants, animals, and other organisms is significant in soil formation. Plants and animals increase the amounts of organic matter and nitrogen, increase or decrease the content of plant nutrients, and change soil structure and porosity. Plants recycle nutrients, accumulate organic matter, and provide food and cover for animals. Plants stabilize the surface layer so that soil-forming processes can continue. Vegetation also provides a more stable environment for soil-forming processes by protecting the soils from extremes in temperature.

The soils in the survey area formed under a succession of briars, brambles, and woody plants that yielded to pines and hardwood trees. Later, the hardwoods suppressed most other plants and became the climax vegetation.

Animals rearrange soil material by roughening the surface, forming and filling channels, and shaping the peds and voids. The soil is mixed by ants, wasps, worms, and spiders that make channels; by crustacea, such as crayfish; and by turtles and foxes that dig burrows. People affect the soil-forming process by tilling crops, removing natural vegetation, establishing different plants, and reducing or increasing soil fertility. Bacteria, fungi, and other microorganisms increase the rate of decomposition of organic matter and increase the release of minerals for plant growth. However, the relationship between plants and animals, climate, and parent materials is very close; therefore, the soils in the survey area do not differ significantly because of the role of plants and animals.

Relief

Relief is the elevations, or inequalities, of land surface considered collectively. Color and wetness of the soil, thickness of the topsoil, content of organic matter, and plant cover are commonly related to relief. In the survey area, the most obvious effects of relief are variations in the color of the soil and the degree of soil wetness. For example, Greenville and Red Bay soils primarily have a dark red subsoil and Bibb, Grady, and Kinston soils are primarily gray throughout. These color differences result from differences in relief and corresponding differences in internal drainage. The Greenville and Red Bay soils, which are on uplands, are better drained than the Bibb, Grady, and Kinston soils, which are in the wetter, low-lying areas. The Greenville and Red Bay soils, therefore, are better oxidized and brighter in color than the Bibb, Grady, and Kinston soils.

The movement of water across the surface and through the soil is controlled to a large extent by relief. Water flowing over the soil commonly carries solid particles and results in either erosion or deposition, depending on the relief. More water runs off sloping areas and less water enters the soil, so the soils are drier in the steeper areas. Lower areas receive the water that flows off and through the higher soils. The lower areas, therefore, are commonly wetter than the higher areas.

Time

The length of time that soil-forming factors act on the parent material determines to a large degree the characteristics of the soil. Most of the soils in the survey area are considered mature. A mature soil is in equilibrium with the environment. It has readily recognized pedogenic horizons and a regular decrease in content of carbon with increasing depth. Some areas of Greenville and Red Bay soils are on broad, stable landscapes where the soil-forming processes have been active for thousands of years. These mature soils have a thick solum and a well expressed zone of illuviation. Kinston and Bibb soils receive sediment annually from flood water. These young soils are stratified and are not old enough to have a zone of illuviation. Young soils do not have well developed pedogenic horizons and have a content of carbon that decreases irregularly with increasing depth.

Geology

Mark E. Hall, geologist, Natural Resources Conservation Service, prepared this section.

Stewart County is in the Fall Line Hills District of the Coastal Plain Physiographic Province. The district is highly dissected by streams. The stream valleys are 50 to 250 feet below the adjacent ridgetops (Clark and Zisa, 1976).

The majority of the surface geology of Stewart County is comprised of nine sedimentary units. The units range in age from Upper Cretaceous (80 million years ago) to Miocene (23.8 to 5.3 million years ago). The geologic units are oriented in a very shallow, downward angle to the southeast. The units are, in ascending order from oldest to youngest, the Blufftown Formation, Cusseta Formation, Ripley Formation, Providence Formation, Clayton Formation, Nanafalia Formation, Tuscahoma Formation, Claiborne Formation, and Altamaha Formation. The following descriptions of these formations are from Reinhardt (and others, 1994) and Cocker (2004).

The four oldest formations are from the Upper Cretaceous. The Blufftown Formation consists of brownish-gray to olive-gray fine sand to sandy clay interfingered with pale yellow coarse sand. The fine sand and sandy clay are further described as calcareous, glauconitic, and micaceous. This formation locally contains carbonaceous debris, shell beds, and calcareous concretions. Outcrops of the Blufftown Formation are in the low-lying areas of the northwestern corner of the county. Cocker (2004) describes the Cusseta Formation as “Generally cross-bedded, white to yellowish to reddish, coarse-grained sand with thinly bedded carbonaceous clay more abundant toward the upper contact.” This formation dominates the northwestern part of the county. The Ripley Formation is described as massive, bioturbated, fine to very fine, calcareous quartz sand. The formation contains abundant mica and glauconite and is locally fossiliferous. This unit primarily outcrops along a narrow band above and southeast of the Cusseta Formation. The Providence Formation is the predominantly exposed formation east of the Ripley Formation in Stewart County. This highly erodible formation consists of pale yellow, cross-bedded, fine- to coarse-grained sand interbedded with yellowish-brown, massive to thinly bedded lenses of sandy clay.

The Lower Paleocene Clayton Formation unconformably overlies the Providence Formation. Cocker (2004) describes the Clayton Formation as primarily a residuum consisting of “red, buff to dark brown, white to light gray and black clay, white chert, and red to black iron oxide masses.” Reinhardt (and others, 1994) report that the formation occurs as limestone interbedded with micaceous silty clay and calcareous limestone. The Clayton Formation in Stewart County is a thin bed (3 to 33 feet thick) between the Providence Formation and the Nanafalia Formation.

The Nanafalia Formation is an Upper Paleocene formation that unconformably overlies the Clayton Formation. The Nanafalia Formation is composed of fine- to coarse-grained, cross-bedded to massive, greenish gray to white, micaceous, kaolinitic quartz sandstone. The formation locally contains layers of potentially economic, high-alumina kaolin and bauxite deposits.

The Upper Paleocene to Lower Eocene Tuscahoma Formation unconformably overlies the Nanafalia Formation. The Tuscahoma Formation consists of dark gray and red to purple, nonfossiliferous, interlaminated clay, silt, and quartz sand beds. The formation begins in the southeastern part of the county. Dividing the county into quarters along a line running from northwest to southeast, the Tuscahoma Formation occurs in the southeastern quarter and pinches out to the northwest.

The Nanafalia and Tuscahoma Formations are unconformably overlain by the Claiborne Group. Cocker (2004) refers to the Claiborne Group as “massive to finely laminated, locally cross-bedded, white to light tan to brick-red, locally kaolinitic, fine- to coarse-grained sand and poorly indurated sandstone.” This unit is highly susceptible to erosion. It is in the southeastern half of Stewart County, pinching out to the northwest.

The Altamaha Formation is a Miocene deposit consisting of massive, brick red, argillaceous sandstone with basal conglomerate chert residuum, iron-oxide-cemented sandstone, or iron-oxide crusts. This formation is characterized by small, rounded, iron-oxide pebbles that are abundant at the surface. This lithology dominates the higher elevations in the southeastern two-thirds of the county. It forms a protective cap rock over the softer, more highly erodible formations.

Quaternary alluvium in the county consists of poorly sorted, fine- to coarse-grained, variably micaceous sediment along flood plains and stream channels. This material comprises the lower terrace deposit along the Chattahoochee River on the western boundary of the county. An upper terrace is comprised of a similar material that is interpreted by Cocker (2004) to be Quaternary to Tertiary in age.

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Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the “National Soil Survey Handbook” (available in local offices of the Natural Resources Conservation Service or on the Internet).

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Aspect. The direction toward which a slope faces. Also called slope aspect.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology). A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. An informal term loosely applied to various portions of a flood plain.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canyon. A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. See Redoximorphic features.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A dense, compact, slowly permeable subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. See Redoximorphic features.

Conglomerate. A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology). A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations). Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Diatomaceous earth. A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Dune. A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Ecosystem services. The benefits that individuals, communities, and economies derive from the environment. Examples include clean water, healthy soils, nutrient cycling, and pollination.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit. Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface. A land surface shaped by the action of erosion, especially by running water.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Fan remnant. A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of ironstone, sandstone, limestone, slate, or shale 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers or streams; produced by stream or river action.

Footslope. The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim (in tables). Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope. A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

L horizon.—A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Interfluve. A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology). A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Iron depletions. See Redoximorphic features.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Ksat. Saturated hydraulic conductivity. (See Permeability.)

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace. A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specifed use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Linear extensibility. Refers to the change in length of an unconfned clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is infuenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coeffcient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength. The soil is not strong enough to support loads.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Map unit. A collection of areas defned and named the same in terms of their soil components or miscellaneous (nonsoil) areas or both. Each map unit differs in some respect from all others in a survey area, and each has a symbol that uniquely identifes the map unit on a soil map. Each individual polygon, point, or line so identifed on the map is referred to as a delineation.

Map unit component. A distinct kind of soil, generally a phase of a taxonomic unit, or miscellaneous (nonsoil) area within a soil map unit. Components can be categorized as either major or minor. The names of major components are used to name the map unit. Each component of a map unit has a unique set of soil properties that differentiates it from other components within the same map unit. Each is assigned a designated range in proportionate extent (percent) within the map unit.

Marl. An earthy, unconsolidated deposit consisting chiefy of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Mass movement. A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses. See Redoximorphic features.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fne sandy loam, loam, silt loam, or silt.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Nodules. See Redoximorphic features.

Nose slope (geomorphology). A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Impermeable	less than 0.0015 inch
Very slow	0.0015 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and fooding.

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artifcially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings. See Redoximorphic features.

Prescribed burning. Deliberately burning an area for specifc management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specifed plant or sequence of plants under specifc management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5

Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. See Redoximorphic features.

Redoximorphic depletions. See Redoximorphic features.

Redoximorphic features. Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:

   A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*

   B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*

   C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.

2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:

   A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*

   B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).

3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix. See Redoximorphic features.

Relief. The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill. A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser. The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat). See Permeability.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Sedimentary rock. A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Series, soil. A group of soils that have profiles that are almost alike. All the soils of a given series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope (geomorphology). A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides (pedogenic). Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 2 percent
Very gently sloping	2 to 5 percent
Gently sloping	5 to 8 percent
Moderately sloping	8 to 12 percent
Strongly sloping	12 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 40 percent
Very steep	40 percent and higher

Slope alluvium. Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Terrace (conservation). An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology). A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread. The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Upland. An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Weathering. All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

°F	*°F*	*°F*	*°F*	*°F*	*Units*	*In*	*In*	*In*	*In*

Days	Days	Days

Bu	Lbs	Lbs	Bu

Bu	*Lbs*	*Lbs*	*Bu*

Bu	Lbs	Lbs	Bu

AUM	*Tons*	*AUM*

AUM	*Tons*	*AUM*

cu ft/ac

cu ft/ac

cu ft/ac

cu ft/ac

cu ft/ac

cu ft/ac

In	*Pct*	*Pct*	*Pct*

In	Pct	Pct	Pct

In	Pct	Pct	Pct

In *Pct* *Pct* *Pct*

In	*Pct*	*Pct*	*Pct*

In	Pct	Pct	Pct

In	Pct	Pct	Pct

In	Pct	Pct	Pct

In	*Pct*	*Pct*	*Pct*

In	*Pct*	*Pct*	*Pct*

In	*Pct*	*Pct*	*Pct*

In	Pct	Pct	Pct

In	In		In

In	In	In

In In In

Ft *Ft*

Ft Ft

Ft Ft

Ft Ft

In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct

In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct

In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct

In	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*pH*	*Pct*

In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct

In	Pct	g/cc	In/hr	In/in	Pct	pH	Pct

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